The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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An Important New Industry

MR. C. S. GARLAND, the managing director of the works of Steatite and Porcelain Products, Ltd., newly established at Stourport, in welcoming some visitors to the works this week, rightly emphasised the importance of introducing virtually a new industry in this country. The industry of high and low tension insulating gear is at this moment of particular importance because it bears so directly on the development of electricity schemes in this country, and also because it provides employment for a considerable colony of workpeople and their families. The fact that Imperial Chemical Industries, Ltd., is behind it is a guarantee of two conditions—that the commercial and production organisation will be really adequate and that there will be a sufficient scientific and technical foundation. No one who has had an opportunity of inspecting the works, the magnificent research laboratory, the housing scheme connected with the enterprise, and the products already available can have any doubt on these points.

The enterprise is interesting from the chemical side, not merely because it is an Imperial Chemicals project, but because applied chemistry comes in at important stages in the analysis of raw materials and in chemical control of various operations, and further because the raw materials themselves have a high physical or chemical interest. Into the manufacture of porcelain for this large-scale insulation work china clay, ball clay, quartz, and felspar all enter, and their preliminary treatment and admixture are largely based on a knowledge of ceramic chemisty. The enormous tests which the company's products successfully withstand testify to the extreme efficiency of all the operations from raw materials to finished product.

The steatite side of the business, however, is even more interesting than the porcelain. For the first time this raw material is being introduced on a really large scale in the manufacture of an immense variety of insulation and similar products. Its special property is that in the condition of a dry powder it can be instantly pressed, either by automatic or hand machines, into the final form required, and the powder is thus converted direct into a hard and solid material. The speed at which such articles as switches, mantle holders, etc., can be produced from this material is amazing, and now that the British rights have been acquired one may expect other industrial applications of so plastic a material. Some account is given in this issue of the character of this new porcelain and steatite enterprise, of its importance to the future of electrical development in this country, and of the immensely high voltage tests which British-made large insulators are now produced to withstand. It is a satisfaction to know that, just at the right moment, this industry should be introduced and should be in hands so capable of handling scientific projects in the right scientific way.

Making Iron Happy

A HEAP of rusty iron has caught our eye, a pile of scrap lying dismal, desolate, neglected, unhappy. Normally we pass it by, too intent on the future, on making new things, more iron, more steel, and fabricating all manner of useful objects from it. To-day we pause, wondering whether the very existence of rust, of decay, is not a reflection on us as chemists: how much are we doing, have we done, to make iron more permanent? Compare it with oak, still seemingly unchanged after one, two, or more centuries of service. Recall those poignant words of G. H. Lawrence: "rustless, life-born, living-tissued old wood; rustless as flesh is rustless, and happy seeming as iron never can be."

True, we are doing much to make iron happy. We paint it with all manner of coatings, using much good paint and spending even more on highly-paid skilled labour to apply it; it would be a sad and sorry day indeed for the paint industry and all those branches of the chemical industry which minister to it when the painting of exposed metal work became unnecessary. Newly invented are the wide range of cellulose var-

nishes, hard-wearing in themselves, cheaply and easily applied by means of a spray gun by unskilled labour. A vast amount of chemical thought, of research, and not a little genius and enterprise, has been given to the manufacture of the many organic solvents for nitro cotton and plastics used in the complicated mixtures that make up the finished cellulose paint. Some day they will be sufficiently cheap and possess such other desiderata as will enable them to be used on structural steelwork, though then, perchance, new horrors might assail our London, if it were decided to give our bridges a cotton coat of many colours.

We are not even quite agreed as to the how and why of rusting; in the past, Dunstan, Moody, and many another knight of the pestle has shivered a lance, argued, discussed, controverted, debated, even wrangled, over the theory of rusting, whilst students, both of engineering and chemistry, of a former régime at one of the great London colleges began their working lives not "with broken dinner knives," as Kipling has it, but in finding out what happens when iron rusts! Yet we—that is, Sheffield—are making progress, for the addition of chromium to steel has long since given us stainless dinner knives and many other useful household utensils. Even if it is whispered that stainless knives lack sharpness, we know from personal experience how greatly the use of a stainless spade lightens the task of the gardener. Somehow, the more general introduction of this material has lagged, perhaps because it was not suitable for cold working.

The newer steel, or rather iron, known as "Staybrite," which contains a larger proportion of chromium and about half as much of nickel but hardly any carbon, has been of the greatest use to the chemical industry, as it is resistant to many reagents which attack stainless steel, including nitric acid: it is also more ductile. We read with interest that it is now proposed to use it generally for the bright parts of a motor car and even for mudguards, which are afterwards painted, the object here being to avoid the formation of rust on the edges and undersides, at which points the paint usually starts to chip or flake off.

The chemist can, therefore, claim to have made a beginning in his quest to make iron happy, though he has still far to go, for we cannot rest content until an iron or steel has been produced for universal use which will at least resist atmospheric corrosion.

The Work of the Chemical Engineers

THE annual meeting of the Chemical Engineering Group last week was the business success that one has confidently come to expect from this active body, and was, in addition, the agreeable function into which the social genius of the retiring chairman, Mr. H. Talbot, would convert even the dullest assembly. The Group may be said to have gained rather than lost importance by the establishment of the Institution, the work of which it admirably supplements. It was not an extreme claim that one speaker made that the Institution, indeed, owes its establishment to the pioneer work done by the Group, and, as far as one can foresee, the Group will continue to find a vocation in the vigorous catalytic effect it imparts to any movement that it touches. It is not merely organised itself most successfully, but it has infused a new and fresher atmosphere into some of the older and more sedate bodies who, viewing its ways with a little suspicion at first, now frankly welcome its invigorating breezes.

The surprising growth of the Chemical Engineering movement within the last decade is due to two causes, which older organisations might with advantage note. The first is its efficient and thorough organisation. Whatever it has undertaken to do it has done really well. The second is its unwavering faith in what a few years ago was a new idea, and its vindication of that faith against considerable indifference and even hostility. The wider recognition that has resulted of chemical engineering as essential to industrial development is equally for the good of industry, and for the chemical engineering profession itself.

The main subject for discussion was the problem of abstracting and classifying scientific literature, introduced shortly by Sir Frederic Nathan. The constant increase in the volume of published scientific and technical matter is making the problem one of unwieldy proportions, and yet the larger the volume becomes the more essential is it that it should be made available to the scientific worker. The discussion did not lead to any common conclusion—it was hardly likely that it would—but it indicated some of the lines along which the subject is being approached, and produced quite a number of suggestions. One of these was in reply to the criticism that the international decimal system was too complicated an affair for the private library or the individual worker. The difficulty, it was pointed out, might be met by the libraries taking over more of this work themselves and thus saving the research worker considerable time. The evening was not long enough to exhaust the full programme arranged for discussion but it left time for Mr. Pooley to make some interesting announcements respecting the jubilee celebrations of the Society of Chemical Industry at the 1931 meeting in London. Lord Melchett, it appears, will then be in the chair.

Books Received

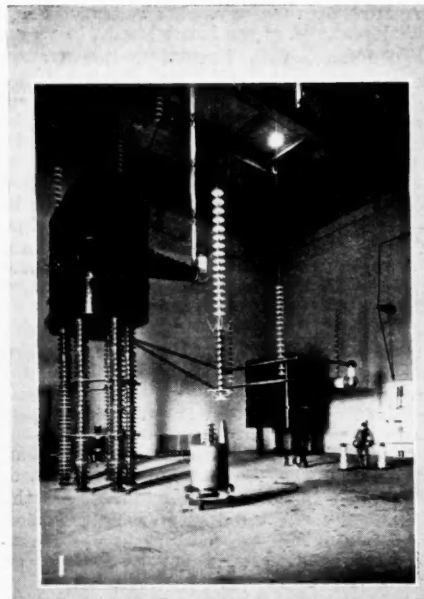
THE INVESTIGATION OF ATMOSPHERIC POLLUTION. Report on Observations in the Year Ended March 31, 1928. Department of Scientific and Industrial Research. London: H.M. Stationery Office. Pp. 68. 3s. 6d.

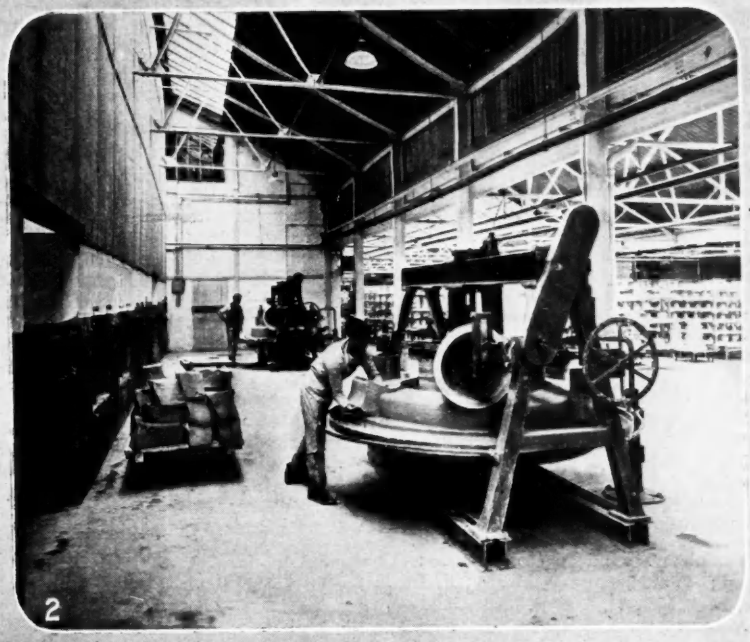
The Calendar

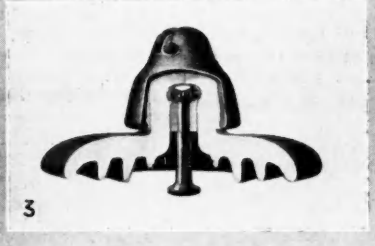
May 23-24	Institute of Chemistry and Society of Chemical Industry (Edinburgh Sections): "Chemistry in Naval Warfare." Professor Kendall.	Edinburgh.
27	East End Hostels Association: Annual Banquet. 7 p.m.	Mansion House, London.
27	Institute of Physics: "The Influence of Physical Research on the Development of Wireless." Dr. W. H. Eccles. 5.30 p.m.	Institution of Electrical Engineers, Savoy Place, London.
June 3	Mineralogical Society. General Meeting. 5.30 p.m.	London.
3, 4 & 5	Society of Glass Technology. Joint Meeting with the Deutsche Glastechnische Gesellschaft.	London.
5	Chemical Society. 8 p.m.	Burlington House, Piccadilly, London.
19	Chemical Society. 8 p.m.	Burlington House, Piccadilly, London.
27	National Physical Laboratory: Visit of Inspection. 3 to 6 p.m.	Teddington.

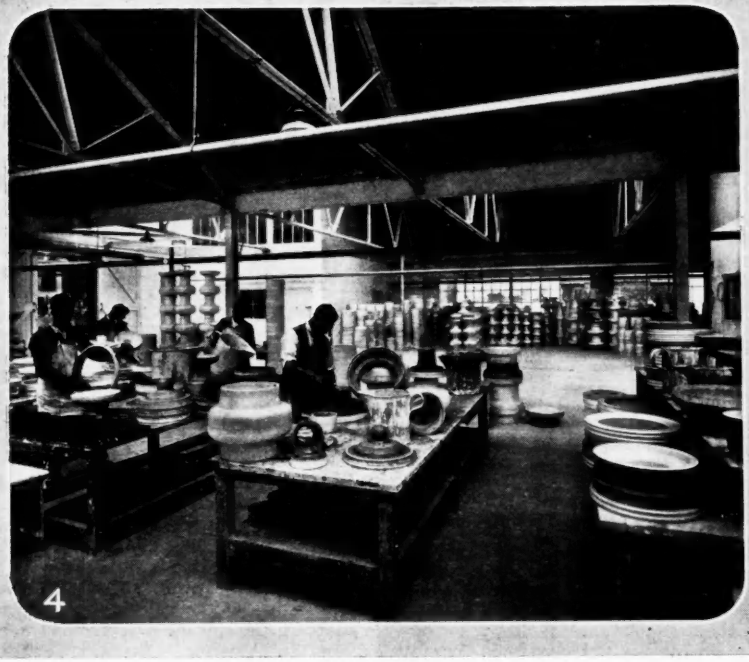
Views at the New Steatite and Porcelain Works, Stourport

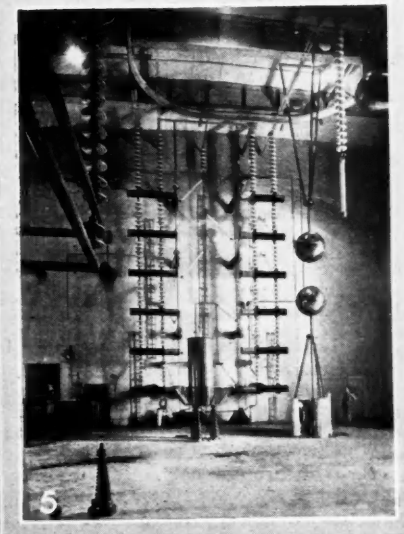
(Formally opened by Lord Melchett on Thursday)











(1) 1,000,000 Volt Testing Transformers in the Research Laboratory. (2) Kneading Machines.
(3) A Spring-ring Insulator. (4) In the Plaster Model-making Shops.
(5) Impulse Generator, Tesla High Frequency Transformer and Measuring Sphere Gap.

Chemical Engineers: Annual Meeting and Dinner

The Problem of Abstracting Scientific Literature

THE Chemical Engineering Group of the Society of Chemical Industry held its eleventh annual general meeting and dinner at the Criterion Restaurant, London, on Friday, May 9, the retiring Chairman (Mr. H. Talbot) in the chair.

Annual Reports

The Hon. Secretary (Mr. W. F. Darke), in his report for 1929, recorded a year of useful work and of slightly increased membership, the latter amounting at the end of 1929, to 474. The steady rise in the number of members from 315 in 1922 formed a gratifying testimonial to the esteem with which the Group was generally regarded.

The papers delivered during the year had reached a particularly high standard of interest and usefulness, and the variety of the visits made in connection with the provincial meetings was mentioned as an outstanding feature of the activities of the year. The Committee was much encouraged to press forward with the general programme of work for which it was instituted.

Mr. F. A. Greene (Hon. Treasurer) presented the accounts, which showed a slight excess of income over expenditure for the year, after making provision for the eleventh annual volume of Proceedings.

Election of Officers and Committee

The following were elected to fill vacancies on the general committee of the Group :—Mr. C. Cooper, Mr. A. A. King, Mr. E. A. Reavell, and Mr. H. Talbot.

The honorary officers elected were :—Chairman, Mr. George Gray ; Hon. Secretary, Mr. W. F. Darke ; Hon. Treasurer, Mr. F. A. Greene.

A hearty vote of thanks was accorded Mr. Talbot for his services as Chairman of the Group for the past two years, and a warm tribute was paid to his work in the past as its Secretary and also as a member of the Committee.

Mr. Talbot, in reply, said he had been connected with the Group since its inception, and it had always been a pleasure to him, as it would be in the future, to do all he could to advance its interests. He felt certain that it had done, was doing, and would continue to do very useful work in the interests of chemical engineering in this country. Rightly or wrongly, he believed the Institution of Chemical Engineers, which was an extraordinarily successful body, had arisen out of the preliminary spade work which the Group had done in the chemical engineering field.

Votes of thanks were also accorded the other hon. officers and the Group Committee.

An After-Dinner Symposium

The meeting was followed by the annual dinner, at which Mr. Talbot again presided. The guests included Dr. Herbert Levinstein (President of the Society of Chemical Industry), Sir Frederic Nathan (Past-President of the Institution of Chemical Engineers), Professor A. F. C. Pollard (President of the Institut Internationale de Bibliographie), Dr. S. C. Bradford (Deputy Keeper of the Science Library), Professor J. C. Philip (Chairman of the Bureau of Chemical Abstracts), Mr. H. J. Pooley (General Secretary of the Society of Chemical Industry), and the chairmen and secretaries of local sections of the Society.

International Abstracting and Classifying

In opening a discussion on "The International Abstracting and Classifying of Scientific Literature," Sir Frederic Nathan said that the magnitude of the existing and rapidly increasing mass of recorded information necessitated the provision of means by which it could be made readily available to workers in every intellectual field. The amount of scientific and technical literature which appeared annually was stupendous, and it was increasing at a stupendous rate. If the fullest use was to be made of it, more systematic methods were required. A comprehensive world scheme covering all scientific and technical literature was Utopian ; probably the organisation that could best deal with it was the Committee on Intellectual Co-operation of the League of Nations. He saw no reason, however, why a beginning should not be made.

The first necessity was that each nation should deal only with the literature of its own country. The present method led to considerable duplication of the better known literature of the principal countries, with consequent unnecessary expenditure of time and money, and neglect of the lesser known literature of the smaller countries, which often contained much valuable information. In order to overcome the language difficulty, he suggested that the abstracts should be prepared in one of the three languages, English, French or German, the official languages of the World Power Conference, and that a paper written in any one language should be abstracted in one of the other two. The second essential was the adoption of a uniform international system of classification. His conclusion was that the universal decimal classification of the Institut Internationale de Bibliographie, of Brussels, was the one best suited to the purpose.

At the meeting of the international executive committee of the World Power Conference, held in Paris in September, it had been suggested by the American representatives that a bibliography on power and fuel should be prepared, and that the matter be referred to the various national committees. The British National Committee had appointed a sub-committee, on which he had served, and the latter had recommended a scheme, practically on the lines he had mentioned. This had been adopted by the national committee, with the recommendation that it be referred to the international executive committee which will meet at the World Power Conference in Berlin next June. He hoped that, if the bibliography on power and fuel materialised internationally, an international bibliography on chemistry, pure and applied, would follow. That was a bigger problem, of course, but he saw no reason why it should not be tackled successfully.

International Decimal Classification

Professor A. F. C. Pollard said it would be agreed that any research worker, before starting any definite research work, should first make a bibliographical study of what had been done previously. Most valuable information was hidden away in papers and in books, and was very difficult to get at in the absence of a universal system of indexing. The problem of indexing the available information was really important, and was becoming more important daily, in view of the extraordinary rate at which the quantity of literature was increasing. A number of bodies in this country, including the Royal Society (for its "B" papers), and many bodies abroad, had adopted the international decimal classification, and its use was rapidly spreading. If all bodies in this country and abroad interested in bibliography adopted a single system and ultimately decided to pool their efforts, a periodical universal bibliography of all knowledge could be produced in an economic manner, and the scientific and industrial portion of this universal bibliography would certainly transcend in magnitude, utility, and perfection the International Catalogue of Scientific Literature which, unfortunately, was no longer with us. So far as he was aware, there was no system in existence which was at once so completely developed, so elastic, or so economic in application as the international decimal classification. So far as he knew, there was no other bibliographical code which could be applied at all to the entire field of pure and industrial chemistry. Any intelligent person could learn how the system was applied to his own subject in under an hour.

Professor J. C. Philip said he was not convinced as to the extent of the advantages which would accrue from the adoption of the international system, and Professor Pollard had been optimistic in suggesting that one could become familiar with the system in an hour. The system would be of prime value to libraries and librarians ; clearly the number of items to be indexed by the new system would run into millions, and it appeared to him that no single individual could hope to utilise the system in his own library or laboratory. The suggestion that each nation should abstract its own literature, he regarded as very undesirable at the present time, because if that practice were adopted, the efficiency of the abstracting systems already existing in America, Germany, and this country, would be seriously reduced, and there would also be lost one of the advantages which the British abstracting system might fairly claim as one of its chief features, *i.e.*, promptness

of publication. The suggestion that under the present system the literature of smaller countries was neglected was true only to a limited extent; the system adopted for looking through the literature of the smaller countries was efficient, and there was co-operation between the Americans and ourselves in that respect. As to the feasibility of adopting an international system, the Americans were dead against it up to the present.

Dr. S. C. Bradford, commenting on the rapid growth of the number of scientific journals published, said that they amounted to something like 700, although they did not all contain scientific matter of first importance. If every bibliographer were to classify his notices on the same system, it would be possible to bring them all into a single index, wherein all papers on any one subject would fall together, and it would then be possible for one to find immediately references to all the information on any particular subject. So far as he knew, the only system that could possibly be adopted as an international system for general use was the Brussels system (international decimal classification). Chemistry, of course, was complicated, and the numbers relating to the various compounds must necessarily be somewhat long, but that did not really matter. The system was one by which one could classify any chemical compound. With regard to the suggestion that individuals could not understand or use it themselves, he emphasised that the research worker ought not to be expected to spend much of his time searching the literature, because his time was more usefully spent in actual research work; it would be of great advantage if libraries undertook the collection and indexing of information and supplied lists of all the papers dealing with any subject, because the time of the research worker could then be saved.

Jubilee Celebrations

Mr. H. J. Pooley (General Secretary of the Society of Chemical Industry) outlined the arrangements made so far in connection with the Society's jubilee celebrations, to be held in London in 1931. It had been decided, he said, to make them almost entirely of a domestic character, although there would be representatives from overseas present. Among those whom the Society wished to honour were those members who had joined the Society in the year in which it was formed, of whom there were 67. A special jubilee medal would be struck, and would be awarded in different forms. Every member attending would be presented with a jubilee plaque of a character not dissimilar to the Berthelot plaque, and the original members would be presented with a similar medal having a special inscription. It was hoped that a member of the Royal Family would be present at the jubilee dinner, and that in his presence the President (Lord Melchett) would hand the medal to distinguished technologists from this and other countries. Meetings would be held for the discussion of papers on the first three days of the jubilee week. A book on the history of chemical industry was being written by Dr. Stephen Miall and would be published at the time of the jubilee celebrations.

Society of Public Analysts

An ordinary meeting of the Society of Public Analysts was held at the Chemical Society's Rooms, Burlington House, London, on Wednesday, May 7, the President, Dr. J. T. Dunn, in the chair. Certificates were read for the first time in favour of John Herbert Bushill, M.Sc., A.I.C., Edward Quentin Laws, B.Sc., A.I.C., and Hubert Taylor, B.Sc., A.I.C.; for the second time in favour of Lionel Stuart Davis, Arthur Smith, B.Sc., A.I.C., and Snow Blagburn Tallantyre, B.Sc., A.R.C.Sc., F.I.C. The following were elected members of the society: Charles Ambrose Adams, B.Sc., F.I.C., Janet Warden Brown, Ph.D., A.I.C., and John Alexander Reddie, F.I.C.

The following papers were read and discussed: "The Diastatic Activity of Honey," by L. H. Lampitt, D.Sc., F.I.C., E. B. Hughes, M.Sc., F.I.C., and H. S. Rooke, M.Sc., A.I.C.; "A New Method for the Separation of Titanium from Zirconium and Hafnium," by A. R. Powell and W. R. Schoeller, Ph.D.; "The Composition and Polymerisation of Chinese Wood (Tung) Oil," by E. R. Bolton, F.I.C., and K. A. Williams B.Sc., A.I.C.; and "The Examination of Milk for Tubercle Bacilli," by D. R. Wood, F.I.C.

Town's Gas for Heat Treatment

Institute of Fuel Paper

At the meeting of the Institute of Fuel, held at the Chemical Society's Rooms, Burlington House, London, on Wednesday, a paper was read on "The Utilisation of Town's Gas as a Fuel in Heat Treatment-Furnaces," by Dr. C. M. Walter. The characteristics of cleanliness and freedom from sulphur compounds associated with town's gas, it was stated, are distinct advantages over producer gases of high sulphur content, and it is usually found that a higher thermal efficiency can be obtained by the use of town's gas in certain operations. Comparatively small space is taken up by the modern furnace working on town's gas, and the ease with which automatic control can be applied, owing to the high B.Th.U. concentration of the gas justifies its adoption when total operating costs, including both fuel and incidental charges, are taken into account.

The Cost Factor

Cost per B.Th.U. is the deciding factor, and providing town's gas could be supplied at a sufficiently low price, it would be capable of carrying out satisfactorily practically every industrial heating operation for which solid fuel or producer gas is used at the present time. To-day, town's gas of a calorific value of 500 B.Th.U.'s per cubic foot or more is available in certain industrial districts at a cost as low as 2·7 pence per therm. In Sheffield, where advantage is being taken of a surplus coke oven gas supply being linked up with the town's gas supply mains, the cost on a B.Th.U. basis has been reduced to such a point that one large firm has proved it desirable to replace some of their very large rivet heating and annealing furnaces, hitherto heated by solid fuel, with town's gas direct from the main. It has also been found that many operations can be carried out at lower fuel costs than with fuel oil, advantages of cleanliness and ease of handling being gained.

The large amount of research work carried out during recent years on refractory materials has led to the very high efficiencies which are now obtainable with the modern type of recuperator furnace.

Design of Furnaces

A description is given in the paper of development in design of gas heated furnaces and of special research work carried out between the Moss Gear Co., Gibbons Brothers, Ltd., and the City of Birmingham Gas Department, which was inaugurated to ascertain how far improvements in working efficiencies could be effected in a battery of four town gas fired oven furnaces installed at the works of the Moss Gear Co. by the employment of special insulating material, improved recuperator elements, and, in particular, the precise control of primary and secondary air, and reduction of losses by leakage through doors and dampers. Results of tests carried out are given in detail, and are significant. In the given operation of carburising, whereas with the older types of furnaces a fuel consumption of 16,000 c. ft. of 500 B.Th.U. gas was required, this work can now be carried out in the improved type furnaces with a consumption of only 6,230 c. ft. of gas of slightly lower calorific value.

The figures available to date do not enable an exact figure of efficiency to be obtained, but it will approximate to over 50 per cent. during the period of heating up the load. It is stated in the paper that in the area of supply of the Birmingham Gas Department, the employment of gas for such processes is increasing rapidly, and during the last twelve months three thousand million cubic feet were supplied for industrial purposes alone.

New Benn Books

Forthcoming publications announced by Ernest Benn, Ltd., include the following: *The Passion Play at Oberammergau*, 1930 (published by arrangement with the Oberammergau Village Council), 4s. 6d.; *Cottage Hospitals*, by Major F. M. Du Plat-Taylor, M.Inst.C.E., John Coleridge, Esq., F.R.I.B.A., and Dr. J. J. Abraham, C.B.E., D.S.O., M.D., F.R.C.S., illustrated with four folding plans, 12s. 6d.; *Modern Gas Fitting in Theory and Practice*, Vol. I, by Stanley Tysoe Phillips, A.M.I.G.E., and G. T. Tutt, 15s.

A New British Chemical Industries Enterprise

Steatite and Porcelain Electrical Insulators

Lord Melchett, on Thursday, officially opened the new research laboratory, one of the finest in the world, established in connection with the recently opened works at Stourport of Steatite and Porcelain Products, Ltd., for the manufacture of electrical insulators, etc. The general character of this new enterprise is described below.

THIS week visits of inspection were paid to the recently-completed factory, research laboratory, and housing estate of Steatite and Porcelain Products, Ltd., at Stourport, Worcestershire, and an account furnished of what is virtually a new industry in this country, of high interest ot the future of the electrical industry and incidentally providing employment for some 1,200 workpeople and housing accommodation for themselves and their families. The new industry is that of high and low tension insulating gear for use in the development of electricity schemes. Hitherto the large insulators for these schemes have mainly been obtained from Germany or the United States. Great Britain, and indeed the Empire, has unfortunately lagged behind in this field, and no adequate research plants for work on high voltage have been available. Arrangements were therefore made, in conjunction with Imperial Chemical Industries and Steatite and Porcelain Products, Ltd., for the establishment of works in Great Britain with an equipment of the most modern and adequate character for the manufacture of electrical porcelain and steatite products, and for the provision of a high tension research laboratory. A very suitable island site of some 70 acres was acquired at Stourport, with convenient railway and river facilities for transport, and near the new super-power station for the area.

Although the public inauguration was delayed until this week, the works have been in efficient operation for some months, and the history of the enterprise goes still further back. The original business was established in 1907 by the erection of a factory at Earlsfield, in South-West London, for the manufacture of magnesia rings and nozzles for the incandescent mantle trade. With the development of the use of electricity for heating, increasing quantities of electrical insulators, particularly those refractory to changes of temperature, were made. In spite of extensions in 1914 and 1920, and the acquisition in 1917 of the works of W. A. Ward and Co., of Nottingham, the business outgrew the accommodation, and with the erection of new and larger works, it was decided to extend the scope of the business to cover the whole range of ceramic electrical insulating materials. Recent advances in the technique of electrical insulation have been based largely on the research work done in the high tension electrical and ceramic research laboratories of two German concerns, Hermsdorf-Schomburg and Steatit-Magnesia companies. Arrangements were made with these, in conjunction with Imperial Chemical Industries and Falk Stadelmann and Co., for the establishment of the present works. The company has an exclusive licence in the British Empire under the patents for insulators owned by the two companies, and a reciprocal arrangement for the interchange of results of research work.

The Porcelain Branch

The principal raw materials for the manufacture of high tension porcelain are china clay, plastic kaolin (ball clay), quartz, and felspar, the most important supplies of which are found in Cornwall and Dorset. Even with the exercise of the utmost vigilance it is difficult for the suppliers of china clay to ensure that this material is always of the same quality and chemical composition, even when taken from the same part of the same mine, and, before delivery is taken of any consignment, it is carefully sampled from the trucks and analyses made and compared with the standard analysis. When the bulk has been passed by the chemist, the raw material passes into the works, and goes through various stages until it reaches, in its finished forms, the kilns.

Two points of great importance are the maintenance of the proper standard of purity and the mixing of the different constituents in exactly the right proportions. Both are automatically secured. To begin with, there is no communication between the storage building and the preparation building except over the silo floor on which the automatic weighing machine is situated. It is, therefore, impossible for any raw materials other than those which have been carefully weighed out to become accidentally mixed with the body. Then, from the silos, the raw materials are delivered through ebonite-lined mouthpieces to an automatic weighing machine, which is controlled through a combination lock set by the works manager. This machine, which weighs up to two tons of the mixture at a time, has an accuracy of ½ lb. or 0·01 per cent. Unless the knife edges are correctly balanced for each material, corresponding to the figure on the combination lock, the mixture cannot be discharged to the grinding mills, thus providing an absolute mechanical control of the body composition. This ensures that the proportions of the various ingredients in the body are accurate to within 0·1 per cent. For control, an examination is made of each batch of raw material, standard test pieces are made, and their electrical and mechanical properties determined. Each charge is also tested to determine the relative degrees of fineness of the particles which it contains.

The Introduction of Steatite

An entirely new feature of the works is the introduction of stealite as a new raw material, so far as this country is concerned. While the basis of porcelain is china clay, a naturally occurring aluminium silicate, steatite is a magnesium silicate which is found native in many parts of the world. Practically all these steatites consist of a combination of magnesium oxide and silica in varying degrees of purity, but the proportions vary enormously, and it is stated that only at one place in the world has steatite so far been discovered which is suitable for the manufacture of electrical insulators. Steatite has a very much higher tensile and bending strength than porcelain, and for high-tension work was first used for types of insulators in which the ceramic part is actually in tension and where, therefore, a very much higher tensile strength was needed. It has been largely developed for the solid core insulator and for the stick insulator which have been extensively used for railway electrification. In the experiments in Switzerland to determine the voltage of lightning and to make use of this force, steatite insulators were used with entire satisfaction. Insulation for almost 10,000,000 volts has been provided for this experimental station, and voltages of over 6,000,000 have been recorded. These insulators have to carry an enormous weight. Of equal importance to its application to high-tension work, where high tensile and bending strengths are required, is its employment for high-frequency telephony and the production of pressed articles of a very high order of accuracy and strength.

Steatite, as distinct from porcelain, has one very remarkable and valuable property. When finely powdered, in the perfectly dry state, it can be instantaneously pressed in hand or automatic presses into solid and hard articles of any shape, according to the die used. Even with the hand press the speed with which such articles as switches, mantle holders, etc., can be turned out is amazing. These require practically no cleaning, and being dry, can be sent on the automatic conveyor direct to the kilns. The contraction of steatite on firing at 1,450° C. is very much less than that of porcelain, the difference being 8 per cent., as against 18 per cent., and steatite articles can be supplied commercially with a tolerance of only 2 per cent., as compared with 5 per cent. and upwards in the case of porcelain.

Just as special precautions were taken to ensure that there was no contamination of the porcelain body, so care has been taken that there is no possibility of the admixture of steatite and porcelain. The ground steatite body from the mill is driven by compressed air directly to a building which is remote from the porcelain preparation building. There it is separated by means of a filter press, the cakes are dried, disintegrated, ground, and delivered in varying degrees of fineness for use in the pressing machines. Steatite does not again come into contact with the porcelain until the two go in separate saggars into the tunnel kiln.

During the inspection of the works one was greatly impressed by the admirable layout, the mechanical handling and labour-saving devices, and the general excellence of the organisation.

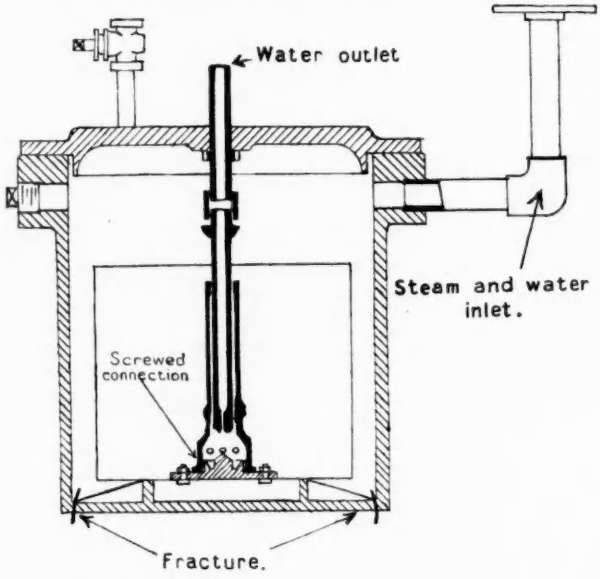
In the research and mechanical laboratories the insulation products of the company were submitted to terrific tests, with complete satisfaction. These included a normal frequency (50 cycles/sec.) flashover of a 22 unit suspension insulator string at 1,045,000 volts, the transformers used each weighing 23 tons, and one of the units being supported on six porcelain columns each 18 ft. high, in order to insulate the transformer. High frequency voltages in excess of 1,000,000 volts at 30,000 cycles/secs. were applied to smooth and shedded porcelain insulators, shorter than the smooth insulator; flashover occurs on the latter at a lower voltage than on the former. Vibration, tensile, and porosity tests were applied, which showed, among other things, the enormous tensile strengths that can be obtained by the use of the spring ring method of pin fixing. An impulse flashover on a suspension insulator string at 1,800,000 volts practically reproduced an actual lightning stroke of an overhead line, and it was noticed that even at this extreme voltage no damage to the insulators occurred.

During the first visit of inspection on Monday, the guests were received by Mr. C. S. Garland, the managing director, who also presided over luncheon, and gave a very clear and concise account of the features of the new industry that was being established and its importance to the development of electricity schemes in this country.

Steam Trap Explosion

Report of Inquiry into Works Mishap

THE following are extracts from the report of the preliminary Board of Trade Inquiry into an explosion from a cast iron steam trap at the works of Imperial Chemical Industries, Ltd. (Brunner Mond and Co., Ltd.), Winnington Works, Northwich, Cheshire, on October 2, 1929 (H.M. Stationery Office, 6d.). No one was killed or injured by the explosion.



The steam trap concerned, which was 37 years old, was one of a group of four placed side by side on a brick bench, for the purpose of collecting the condensed water from the steam coils of an ammonia evaporator. As the evaporator was used for making up losses of ammonia in the chemical plant, it was only necessary to use it once or twice a week for a period of about six hours each time. The explosion was of a violent nature, the body of the trap being lifted from the base and deposited about 3 ft. away, the base being left in its original position. The cause, states the report, was external corrosion thinning the base of the trap until it was not sufficiently strong to withstand the internal pressure.

The trap (shown in the illustration) was of the automatic type, and was designed to collect and deliver condensed water into a tank situated above its own level. The chest was made of cast iron, 13¼ in. inside diameter, 14½ in. in height and ½ in. in thickness, with a cast iron cover ¾ in. thick bolted on by means of eight bolts ⅝ in. in diameter. The internal fittings consisted of a sheet iron bucket 10⅞ in. in diameter and 9 in. in height, at the bottom of which was bolted a valve and guide. A tube was passed through a hole in the centre of the cover carrying at its lowest point a valve seat, and this tube was a working fit into the guide.

The action of the trap was as follows:—As the internal bucket floated in the water contained in the trap, the valve was kept closed, but when the water rose high enough to overflow into the bucket, the latter sank under the weight and left the valve open, the water then being blown through holes in the guide tube up the central tube and discharged into the collecting tank. As the contents were blown out, the float again rose, and thus closed the valve. The only repairs carried out had been the grinding in of the valve, done by the staff whenever the valve showed signs of leaking and there was no regular inspection of the trap.

The Explosion

A shift foreman of the plant, whose duties included that of seeing to the efficient working of the steam traps, stated that on the morning of October 2, 1929, steam had been on the evaporator for about four hours when at 12.45 a.m., without any previous warning, a violent explosion occurred, and he saw steam and water issuing from the inlet pipe to No. 4 trap. He immediately shut the stop valve and found that the body of the trap had broken away from the base, and was deposited about 3 ft. away. On examination it was found that the bottom of the trap was very badly corroded externally, parts of the metal being reduced to a thickness of $\frac{1}{16}$ in., and this had undoubtedly been the cause of the explosion. The steam traps, as stated, were placed on a brick bench, and a certain amount of water had been allowed to collect on this bench. This in itself would be sufficient to cause corrosion, but it had been intensified by the fact that owing to the intermittent use of the traps this water would at times be cold and at other times heated by the working traps. The inside of the trap did not show any signs of deterioration, and the external corrosion was not noticed. After the explosion other traps were broken and found to be in a similar condition.

Three new traps of thicker material, adds the report, have now been installed and these have been slightly raised from the platform. This, it is thought, will prevent a recurrence of the accident as an examination can now be made at any time, and the air space between the surfaces should lessen the possibility of corrosion taking place.

A further observation of the Engineer Surveyor-in-Chief is that steam traps of this type have to withstand the same pressure as that to which the apparatus, or steam pipes to which they are connected, are subjected and this fact should not be overlooked when installing steam plant, or when inspections of the working parts of traps are made. If corrosion is found to be present an hydraulic test will disclose whether the apparatus can safely withstand the working pressure. The steam trap dealt with had apparently been working for 37 years, and, in the circumstances, wastage might have been expected, and its dangerous condition should have been discovered before it became so corroded as to be unfit for the working pressure and thus to endanger the lives of the operators.

General Refractories, Ltd.

AT the annual meeting of General Refractories, Ltd., which was held on Friday, May 9, in Sheffield, the Chairman, Mr. Frank Russell, F.G.S., announced that the trading profits of the concerns, wholly or partly owned by them, were well in advance of last year. Though the accounts did not include any receipts from the subsidiaries, their own separate profits provided sufficient to pay the dividend of 12½ per cent., leaving the profits of the controlled companies to be brought into the accounts for 1930. The re-equipment they had already effected had been so successful that the Board were convinced that the policy must be applied at the earliest possible moment to the whole of the plants under their control. Further extensions had also become imperative as the output capacity of certain departments was insufficient to enable them to keep pace with orders, and the company would make a further issue of shares at once.

Oil and Colour Chemists' Annual Meeting

Methods of Preparing Wood Oil in Paints and Varnishes

The need for broadening the basis of the Association and making it an effective link between the purely scientific and the practical worker was stressed at the annual meeting of the Oil and Colour Chemists Association. At the ordinary meeting which followed, a paper on "Technical Methods of Preparing Wood Oil in Paints and Varnishes" was read by Mr. A. W. C. Harrison.

THE annual general meeting of the Oil and Colour Chemists Association was held at the Institute of Chemistry on Thursday, May 8, Dr. J. J. Fox, the retiring President, in the chair. The report of the Council showed that the membership had increased during the year by 15 ordinary members, three associate members and one junior member, a total of 19. The actual number of new members elected during the year was 38, but there have been nine resignations and ten names have been removed from the register.

The President and the Vice-Presidents, Messrs. H. D. Bradford, Noel Heaton, C. A. Klein and C. A. Macinlay, all retire and are ineligible for re-election. Mr. J. A. F. Wilkinson, another retiring Vice-President, is eligible for re-election, and the following nominations of the Council for President and Vice-Presidents were approved by the meeting, namely:—President: Mr. Noel Heaton; Vice-Presidents: T. H. Bridge; S. G. Clifford; A. H. Davis; Dr. J. J. Fox; and J. A. F. Wilkinson. Vacancies on the Council were created by the retirement of T. Clayton, R. G. Daniels, W. Geary and Dr. R. S. Morrell. There being no additions to the Council's nominations for new members of the Council, the following were duly elected:—G. Copping, A. W. C. Harrison, G. N. Hill and A. Selby Wood.

During the year the Association was invited to consider the proposed draft regulations for methylated spirits of the Customs and Excise. A Sub-Committee of the Association was formed and reported to the authorities at Customs House, and most of the recommendations were accepted.

A satisfactory report was also made with regard to the Manchester section, the membership of which on December 31 was 90, an increase of five. Regret was expressed at the death of the late Chairman, Mr. J. B. Shaw.

The report and the accounts, which showed a small credit balance, were adopted.

Mr. Noel Heaton then took the Presidential chair in succession to Dr. J. J. Fox, and in acknowledging his election, said his feelings had always been towards broadening the basis of the Association rather than narrowing it, and he looked forward to making the Association a bond of union between the purely scientific worker and the more practical worker.

Dr. H. H. Morgan, proposing a vote of thanks to the retiring President, Vice-Presidents and members of Council, said the Association should be made more than just a paint and varnish industrial association. He was in full sympathy with the remarks of the President that an endeavour should be made to bring the scientific worker into close co-operation with the practical man and to keep the Association in touch with scientific people outside the industry.

The Behaviour of Wood Oil

In his paper on "Some Technical Methods of Preparing Wood Oil in Paints and Varnishes," Mr. A. W. C. Harrison said there had been until recently, a great deal of misconception about the mysterious behaviour of wood oil; much of it due, however, to the fact that wood oil was collected in such widespread districts under such primitive conditions, and actually recovered under such primitive conditions, that it was always liable to variation through adulteration. To a large extent it had hitherto been impossible to get any very definite results or to repeat any given results that had been obtained. The peculiar attributes of this oil, however, must be carefully studied before there could be any understanding of how it could be used. The main characteristic which might be so useful as a varnish and paint constituent was that it had very great drying properties; it not only dried rapidly, but it dried with a very hard film which was much less pervious to water than a similar film of linseed oil. There was also much less tendency for a dry film of wood oil to hydrolise on contact with water or caustic and it was much more resistant to caustic than linseed oil.

Wood oil, as it dried, tended to form two particular types of film. One had a frosted and the other a wrinkled appearance. If the latter film were examined under the microscope it would be seen that the so-called frosted effect was really a mass of very small folds and wrinkles similar to those seen on the surface, which to the eye had a wrinkled appearance.

The mere fact that on heating wood oil to 525 deg. it could be made safe to use in varnishes, was not a safeguard that such an oil would make a perfect wood oil varnish. Even if a wood oil had been prepared so that it did not show all the undesirable characteristics when put into a paint or varnish, that was no proof that the wood oil would be usable, because if subsequently the oil was heated up to anything near the temperatures that had been used in preparing it, the oil would sooner or later turn solid or go to a slimy jelly.

The quick drying properties of wood oil were valuable as making it possible to prepare pale varnishes, the reason being that the amount of linoleate of lead or linoleate of cobalt siccative necessary with a wood oil is very much less than is required in the case of linseed oil.

Wrinkling

Another misconception was that some marvellous secret ingredient must be added to wood oil for heat treatment processes in order to safeguard it from the tendency to turn solid during and after the process, and also to overcome the tendency to wrinkle or shrivel. Under reasonable drying conditions it is possible to prepare a wood oil with no other ingredient whatever, except either metallic oxide or linoleate. Wood oil, of course, had to be treated to overcome the tendency to wrinkle and this all boiled down to one point, that it must be polymerised and, of course, polymerisation had been carried out by various methods.

In the course of work done by himself, in which he had been greatly helped by Dr. Jordan and his collaborators, the conclusion had been arrived at that the one thing affecting the rate of polymerisation of wood oil was the acid value, and Dr. Cutter had compiled a short history and development of heat testing of wood oil in which this point had been made abundantly clear. All the substances which had been proposed as additions to wood oil to hinder gelation and counteract the wrinkling effect had been proved in fact to have a tendency to hasten gelation. Experiments had also shown that high temperature also rapidly affects the iodine value, independently of the degree of polymerisation. Another thing which affected iodine value was exposure to air, as well as to light, and therefore iodine value was not a reliable guide.

Methods of Treatment

The chief fault of wood oil was the tendency to wrinkle, and it was not a thing which could be guarded against unless the oil had been taken to a point that was practically unsafe in heating. There were several commercial methods of treating wood oil so that most of the good and useful properties could be retained. The earliest and most obvious one which, however, gave a product somewhat limited in its application, was the simple heating of raw wood oil with a fair proportion of common resin. That gave a hard, quick-drying varnish which, however, was quite useless for out-door use and not at all resistant to water. A similar process giving a better product was to use glyceride of resin or ester gums. Another method was to heat the wood oil in a special type of plant, carrying the heating to a point determined by experience, the temperatures being controlled very accurately. Yet another was the rapid addition of a solid ingredient—ester gum—to the finished treated wood oil, assuming that a pure wood oil and resin varnish was required. The great difficulty about all these heating processes was that a wood oil could be treated and even mishandled in the laboratory by all sorts of men, and although relatively little trouble might occur, they must be regarded largely as hit or miss methods. In small batches, perhaps, the position was not so serious as in the case of large batches, because as the batch increased the poly-

merisation of the wood oil was accompanied by a very strong exothermic reaction.

Mr. Harrison emphasised the need for rapid mechanical stirring and sketched on the blackboard the outlines of a desirable stirrer of a four-bladed propeller type, the propeller working near the bottom of the tank and the blades being made of small cross sections in order to give more effective swirl of the material. With a hard drying film such as given by pure wood oil, there was an early breakdown which was not actually chemical decomposition or destruction in the ordinary sense. It was purely mechanical, and after a certain time shrinkage set in and the whole of the film split. This, however, could be largely overcome by the addition of linseed oil. The net result of all these tests and many others indicated that varnishes containing only tung oil were not so good as those in which some linseed oil had been incorporated.

U.S. and British Consumption

Opening the discussion, Dr. L. A. Jordan said some people seemed to doubt whether there was any room for the development of the production of tung oil in the Empire. Broadly speaking, the American consumption was 40,000 tons per annum, whilst the British consumption was less than 4,000 tons. The population of the United States was something more than twice that of this country, but the consumption of paint per head in the United States was three times what it is in this country so that there was considerable room for improvement. The consumption of linseed oil in this country for paint and varnish was approximately 50,000 tons per annum, so that the ratio of tung oil to linseed oil was not much more than 6 per cent. He could imagine a time when the proportion would be 25 per cent. tung oil to 75 per cent. linseed oil and on that basis, with an acceptable price, the consumption would be 10,000 tons of tung oil per annum. With such a consumption, prices would not be what they are to-day, and he would go so far as to suggest that within the next ten years the consumption would be some 10,000 tons per annum at a price not more than £5 or £10 greater than that of linseed oil. Furthermore, the United States had recognised that ultimately the supplies of tung oil which the States would require for its own purposes could only be satisfied from the tropical countries of the British Empire. The first characteristic of any test on these oils was to be able to do the same thing twice. Therefore, if things did not happen he just washed that method out and tried in another way. On one occasion at Teddington they had been able, for four days, to heat tung oil without gelation taking place, apart from any consideration of acid value, but they had never been able to do it since. The experiment was carried out alongside the heating of the same tung oil in ordinary closed vessels when the oil always gelated. But in the other case it did not, and this seemed to indicate that there was something in the final consummation of the gelation, as it were, that had never yet come to light.

The President expressed regret that there was no further time for discussion, and invited written contributions to the discussion from other members.

Exports of British Disinfectants and Insecticides

SHIPMENTS of disinfectants, insecticides, weed killers, and sheep and cattle dressings, except tobacco offal, containing no dutiable ingredients, from Great Britain for the year 1929, amounting to £1,043,071 (434,112 cwt.), showed little variance from the preceding years. Data are not available showing the distribution of disinfectants, insecticides, weed killers, and sheep and cattle dressings in 1929, but the following table shows the principal British markets for these products in 1927 and 1928 :—

	1929		1928	
	Cwt.	Value	Cwt.	Value
Brazil	10,686	£24,389	8,924	£23,597
Uruguay	4,906	13,045	7,652	21,302
Argentina	137,610	330,226	157,019	370,716
Irish Free State ..	14,487	57,457	14,777	56,016
British South Africa	52,372	114,405	58,406	138,534
British India.....	28,159	50,962	28,906	54,052
Australia	10,262	29,799	10,274	24,054
New Zealand.....	31,042	105,108	34,046	118,269
Other countries ..	124,333	306,534	111,361	267,712
Total	413,857	1,032,525	431,365	1,075,452

Canadian Sodium Sulphate Deposit

Large-scale Development in Progress

THE Canadian Horseshoe Lake Mining Company is erecting a plant near Ormiston (about 75 miles south-west of Regina, Sask.) for the development of an important deposit of sodium sulphate. Some 200 to 250 men are at present employed on construction, and the plant is expected to cost about $500,000. Railway tracks are being laid to the deposit, which is 30 ft. thick at the centre and contains at least 9,000,000 tons of the natural crystals. The sodium sulphate, which is worth from $22 to $23 per ton, will be excavated by steam shovels and dehydrated in the plant now under construction.

The company named has been incorporated by the Barium Reduction Corporation of Charleston, West Virginia, U.S.A., in conjunction with the International Nickel Co. of Canada, Ltd. Sodium sulphate is now largely used as a flux for the refining of nickel ores, and the company has a ten-year contract with the International Nickel Co., under which 36,000 tons will be delivered during the first year of operation, with provision for increased quantities in later years. The plant is expected to be in operation on June 1 next. The Horseshoe Lake Mining Co. also intends to supply sodium sulphate to the barium plants in West Virginia for use in the manufacture of barium sulphate, largely utilised in the rubber industry in the production of rubber tyres and other products.

The sodium sulphate will be utilised by the International Nickel Co., in conjunction with sulphuric acid produced by a new plant being constructed by Canadian Industries, Ltd., at Copper Cliff, near Sudbury, Ontario, where sulphur gases from the nickel smelter will be converted into acid and subsequently into nitre cake for fluxing copper-nickel ores.

Great Potential Value

The sodium sulphate deposits of Saskatchewan have been known for many years and, as a result of examinations conducted by the Dominion Department of Mines, it has been established that they contain well over 100,000,000 tons of the natural hydrous salt. These deposits have been looked on as of great potential value not only to meet commercial requirements in Canada, but because of the possibility of developing important export markets. One of the important uses in Canada is in the pulp and paper industry, where large tonnages of the anhydrous sodium sulphate or "salt cake" are used in the production of sulphate or kraft pulp.

Imports of salt cake into Canada in 1929 were recently given by the Dominion Bureau of Statistics as 39,512 tons, valued at $514,212; in addition to which Glauber's salt to a total of 362 tons at $4,450, and bisulphate of soda, or nitre cake, amounting to 80,872 tons, valued at $1,081,984, were also imported.

Against these requirements for sodium sulphate or its products, the production of natural sodium sulphate from Canadian deposits during 1929 totalled only 6,592 tons, valued at $70,396. The new industry starting at Ormiston, Saskatchewan, may therefore be looked on as the beginning of utilisation on a large scale of the hitherto almost unexploited deposits of this valuable chemical, which is found in such abundance on the prairies of Western Canada.

American Dyestuffs Merger

THE American Cyanamid Co. has taken over three more dye companies. The latest acquisitions are the Wettersol Dyestuff Corporation, the Wetterwald and Pfister Co., and the Dye Products and Chemical Co. This merger brings the number of dyestuff and allied concerns acquired to eleven, the companies previously taken over being the May Chemical Works, sulphur dioxide division of the King Chemical Co.; the Textile Chemical Co. of Providence; the Crown Chemical Co.; Garfield Aniline Works of New Jersey; Passaic Color Corporation, the Beaver Chemical Co. of Damascus, Va., and Heller and Merz. The Wetterwald and Pfister Co. are importers of dyes; the associated concern, Wettersol Dyestuff Corporation, are manufacturers of vat dyes. Dye Products and Chemical Co. manufacture acid dyes for the textile trade. The three new acquisitions will be combined with the Calco Chemical Co. of New Jersey, the Cyanamid Co.'s large subsidiary engaged in the manufacture of intermediates and in the sale of these products.

British Chemical Overseas Trade for April

Big Drop in Imports

OVERSEAS trade in chemicals, according to the Board of Trade returns for April, showed a decline in all three sections compared with the corresponding month last year. By far the largest drop was in imports, which at £1,089,451, were £278,110 lower than in April, 1929. Exports, at £1,985,295, were £70,200 lower, and re-exports, at £51,234, dropped £39,234.

Imports

	Quantities Month ended April 30, 1929.	Quantities Month ended April 30, 1930.	Value Month ended April 30, 1929.	Value Month ended April 30, 1930.
CHEMICAL MANUFACTURES AND PRODUCTS—			£	£
Acetic Anhydride..cwt. } Acid Acetic .....tons }	tons 1,374	— 586	56,775	22,599
Acid Tartaric .....cwt.	3,693	2,034	23,786	13,389
Bleaching Materials ,,	15,702	8,458	12,596	8,907
Borax ..... ,,	29,700	12,929	23,007	8,443
Calcium Carbide ... ,,	72,221	57,541	43,923	36,779
Coal Tar Products not elsewhere specified value	—	—	1,946	3,000
Glycerine, Crude...cwt.	140	139	243	303
Glycerine, Distilled ,,	1,103	688	2,615	1,589
Red Lead and Orange Lead ..... ,,	2,545	4,746	3,843	7,277
Nickel Oxide..... ,,	113	114	571	530
Potassium Nitrate (saltpetre) .....cwt.	9,825	6,712	9,968	6,651
Other Potassium Compounds ..... ,,	584,308	334,380	162,084	84,479
Sodium Nitrate.... ,,	145,893	83,338	70,034	37,924
Other Sodium Compounds .....cwt.	48,766	38,716	27,593	31,205
Tartar, Cream of.. ,,	3,146	2,096	14,036	9,915
Zinc Oxide.....tons	932	906	26,774	26,018
All other sorts....value	—	—	315,356	253,767
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	141,820	82,906	9,968	6,450
Bark Cinchona (Bark Peruvian, etc.) ..cwt.	642	363	2,706	1,617
Other Sorts .....value	—	—	145,106	180,753
DYES AND DYESTUFFS—				
Intermediate Coal Tar Products .....cwt.	80	77	1,275	935
Alizarine ..... ,,	335	29	14,796	1,367
Indigo, Synthetic.. ,,	—	—	—	—
Other Sorts..... ,,	4,154	3,417	96,951	80,739
Cutch ..... ,,	7,814	3,833	12,908	6,308
Other Dyeing Extracts cwt.	2,924	3,264	9,609	9,785
Indigo, natural.... ,,	76	—	2,115	—
Extracts for Tanning ,,	67,848	83,635	72,599	84,594
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground ...cwt.	112,672	37,396	21,034	8,622
White Lead (dry).. ,,	14,238	11,874	23,555	20,520
All Other Sorts.... ,,	110,722	95,235	159,789	134,986
Total of Chemicals, Drugs, Dyes and Colours.....value	—	—	1,367,561	1,089,451

Exports

CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Sulphuric ....cwt.	2,221	7,364	2,881	2,253
Acid Tartaric ..... ,,	943	1,022	7,403	7,741
Ammonium Chloride (muriate) .....tons	292	234	6,354	4,658
Ammonium Sulphate—				
To Spain and Canaries tons	1,695	10,339	17,407	83,215
,, Italy ..... ,,	545	20	5,153	198
,, Dutch East Indies	959	2,021	10,161	17,687
,, China (including Hong Kong) tons	6,477	9,894	68,926	85,959
,, Japan ..... ,,	17,191	17,774	179,653	148,243
,, British West India Islands and British Guiana tons	760	628	7,749	5,199
,, Other Countries tons	5,588	9,537	56,742	80,519
Total..... ,,	33,215	50,213	345,791	421,020

	Quantities Month ended April 30, 1929.	Quantities Month ended April 30, 1930.	Value Month ended April 30, 1929.	Value Month ended April 30, 1930.
			£	£
Bleaching Powder..cwt.	35,172	50,513	10,623	13,885
COAL TAR PRODUCTS—				
Anthracene .....cwt.	—	—	—	—
Benzol and Toluol..gall.	18,198	73,418	2,270	7,398
Carbolic Acid.....cwt. } Cresylic Acid.....gall. }	cwt. 19,547	5,142 112,016	28,688	11,004 14,352
Naphtha ..... ,,	3,312	4,317	265	475
Naphthalene (excluding Naphthalene Oil) cwt.	5,012	11,839	2,160	3,464
Tar Oil, Creosote Oil, etc. gall.	3,746,539	4,392,479	109,837	113,520
Other Sorts.....cwt.	29,987	44,746	13,775	19,722
Total.....value	—	—	156,995	169,935
Copper, Sulphate of..tons	6,172	5,771	157,631	137,555
Disinfectants, Insecticides, etc. .....cwt.	30,692	21,722	73,446	49,917
Glycerine, Crude.....cwt.	12,275	3,216	15,546	4,299
Glycerine, Distilled... ,,	11,976	8,703	35,284	23,066
Total..... ,,	24,251	11,919	50,830	27,365
POTASSIUM COMPOUNDS—				
Chromate and Bi-chromate .....cwt.	1,388	770	2,842	1,552
Nitrate (Saltpetre). ,,	857	743	1,661	1,381
All Other Compounds cwt.	6,162	5,298	13,411	8,581
Total..... ,,	8,407	6,811	17,914	11,514
SODIUM COMPOUNDS—				
Carbonate .....cwt.	440,149	307,657	120,603	84,807
Caustic ..... ,,	143,632	156,240	96,603	106,140
Chromate and Bi-chromate..... ,,	2,185	1,447	3,817	2,373
Sulphate, including Salt Cake .....cwt.	129,632	89,109	14,555	11,101
All Other Compounds cwt.	40,604	40,557	45,565	42,279
Total..... ,,	756,202	595,010	281,143	246,700
Zinc Oxide.....tons	166	158	5,587	4,810
Chemical Manufactures,etc., all Other Sorts..value	—	—	277,090	293,864
Total of Chemical Manufactures and Products (other than Drugs and Dyestuffs) .value	—	—	1,393,688	1,391,217
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	185,156	205,210	16,669	19,788
All Other Sorts...value	—	—	238,063	225,134
Total..... ,,	—	—	254,732	244,922
DYES AND DYESTUFFS—				
Products of Coal Tar cwt.	11,007	8,820	74,405	69,832
Other Sorts..... ,,	4,894	11,957	5,744	10,146
Total..... ,,	15,901	20,777	80,149	79,978
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground...cwt.	2,370	1,898	1,378	1,281
White Lead (dry).. ,,	2,675	1,501	5,547	2,992
Paints and Colours in Paste Form.....cwt.	46,560	28,159	91,978	58,945
Paints and Enamels prepared (including ready mixed) .....cwt.	44,329	39,566	138,740	127,640
All Other Sorts.... ,,	48,652	44,005	89,283	78,320
Total..... ,,	144,586	115,129	326,926	269,178
Total of Chemicals, Drugs, Dyes and Colours .....value	—	—	2,055,495	1,985,295

Re-Exports

	Quantities Month ended April 30, 1929.	Quantities Month ended April 30, 1930.	Value Month ended April 30, 1929. £	Value Month ended April 30, 1930. £
CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Tartaric .....cwt.	80	67	639	538
Borax ..... ,,	21	618	19	387
Coal Tar Products value	—	—	38	60
Potassium Nitrate (Saltpetre) .....cwt.	93	91	139	113
Sodium Nitrate.... ,,	21,156	2,359	11,119	1,205
Tartar, Cream of.. ,,	496	232	2,303	1,202
All Other Sorts...value	—	—	16,332	13,972
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	15,955	4,828	1,637	441
Bark Cinchona (Bark Peruvian, etc.)..cwt.	187	323	1,499	2,720
All Other Sorts...value	—	—	39,150	25,136
DYES AND DYESTUFFS—				
Cutch .....cwt.	2,597	1,134	4,063	1,631
All Other Sorts.... ,,	44	63	406	229
Indigo, Natural.... ,,	—	—	2	—
Extracts for Tanning ,,	614	445	757	773
PAINTERS' COLOURS AND MATERIALS ....cwt.	54,042	789	12,241	2,180
Total of Chemicals, Drugs, Dyes and Colours ....cwt.	—	—	90,468	51,234

Overseas China Clay Trade

Import Figures for April

A RETURN of the quantities and value of China Clay (including China stone) imported into Great Britain and Northern Ireland, as registered in the month of April last, is as follows :—

COUNTRIES WHENCE CONSIGNED.	QUANTITY. Tons.	VALUE. £
Germany	13	92
Switzerland	1	10
U.S. America	18	114
Total	32	216

April Exports

EXPORTS of China Clay, including Cornish or China stone, from Great Britain and Northern Ireland during April were :—

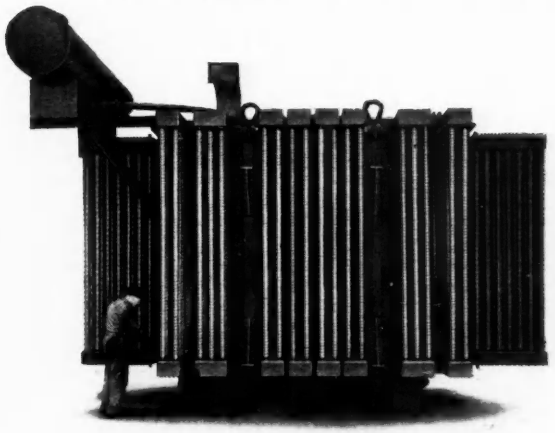
COUNTRY OF DESTINATION.	QUANTITY. Tons.	VALUE. £
Finland	340	451
Estonia	390	634
Sweden	1,978	4,088
Norway	1,963	3,422
Denmark	2	16
Germany	2,629	6,310
Netherlands	4,051	8,881
Java	6	20
Belgium	4,299	8,618
France	3,188	6,758
Switzerland	87	274
Madeira	—	4
Spain	2,045	4,563
Italy	2,930	7,347
China	5	33
Japan	—	1
United States of America	24,055	51,300
Chile	4	20
Argentine Republic	246	671
Channel Islands	—	1
Malta and Gozo	—	1
Union of South Africa	3	33
South-West Africa Territory	2	28
British India	1,751	6,927
Madras	15	105
Bengal, Assam, Bihar and Orissa	178	781
Malay States	—	6
Australia	23	171
Canada	1,126	3,177
Total	51,316	114,641

Mild Steel Transformer Tanks

Large Plant for Electricity Board

SOME notable examples of chemical engineering and other industrial plant stand to the credit of G. A. Harvey and Co. (London), Ltd., Woolwich Road, London, S.E.7, and our illustration shows their latest production, one of the largest electrical transformer tanks ever produced, constructed to special design for the " grid " scheme of the Central Electricity Board for South-East England. It is the first of a number on hand and is built for working at a capacity of 15,000 k.v.o,, 132,000 volts, 50 cycles, three-phase.

The tank is fitted with the firm's " Harco " pattern gilled tubes for cooling purposes. These are of mild steel, weigh considerably less than cast iron, and do not crack or break when



subjected to variations in temperature. Greater efficiency is obtained owing to the inner edge of the gills being crimped during the operation of fixing, with the result that the surface of contact with the tube is increased as well as the radiation area.

These batteries of gilled tubes can be detached without emptying the oil from the tank, owing to the provision of special valves, which when closed isolate the radiator from the tank, when it can be drained of oil and removed. The chief object in having these radiators detachable, however, is to facilitate transport from the works to the site. The tubes can be manufactured to withstand pressures up to 700 lb. per sq. in.

Anglo-American Colliery Development in British Columbia

THERE has recently been incorporated at Victoria, B.C., a company styled the Canadian Coal and Iron Co., Ltd., constituting an amalgamation of the chief independent coal mines and properties not included in the Canadian Collieries-Western Fuel Corporation merger last year. The company will undertake extensive work in connection with coal by-products, and may take up the production of pig iron from certain deposits of ore now under option on the British Columbia mainland. The directors include representatives of British, American and Canadian interests and the total capitalisation is stated to be $10,000,000. In connection with the contemplated production of coal by-products, research organisation is to be established to determine the suitability of Vancouver Island coal for distillation and manufacturing into gasoline fuel oil, lubricating oil, paraffin, glycerine, alcohol, coke, synthetic rubber, soap, dyes, perfumery, etc. Research work will also be carried on in connection with the recovery of iron from ores brought from mainland deposits, as well as on the production of fireclays.

Death of Mr. R. W. de Greeff

MR. ROBERT WILLIAM DE GREEFF, founder of the well-known chemical firm of R. W. Greeff and Co., Ltd., passed away peacefully on Sunday, May 11, at his residence, Elm Bank, Widmore, Bickley, Kent, aged 77 years.

Unemployment and Work

By Sir Ernest J. P. Benn

The fundamentals of the problem of unemployment and the necessity of a right understanding of its causes before we can attempt a cure, are dealt with by Sir Ernest Benn in the third article of his series on "Unemployment and Work," which is given below. The first two articles appeared in "The Chemical Age" of May 3 and 10.

III.—Thinking Upside Down

It is not easy for a casual observer to grasp all that was in the mind of the artist if a picture is hung upside down, or to appreciate the beauties of a composition from the back of the canvas. Yet we continue day by day to potter about with the unemployment problem with an almost complete disregard of its essentials and a totally inverted view of its nature. If we start at the beginning, and consider an elementary example, this becomes apparent. Suppose we ask: What is a carpenter? Why does he exist? How did he arise? What are the conditions which brought him about? How long will he last? What are his obligations to others and the obligations of others to him? Unless we can answer such questions as these in a way to satisfy ourselves, we admit in advance our incapacity to discuss the employment of a carpenter. When, however, the subject is approached in this simple way, a number of long-forgotten but very obvious truths begin to dawn upon us.

The carpenter exists, we observe, as a carpenter because his neighbours are in need of woodwork. As civilisation evolved there gradually developed a sort of social contract between the carpenter and the rest, that if he would provide woodwork as and when the others were in need of it, they, on their part, would supply him with other things in return. An implied condition of the contract, quite essential to its proper working, left it understood on both sides that when the requirements of the neighbours in the matter of carpentering were satisfied, or of the carpenter in the matter of any particular article for which he exchanged his labour were filled, either party was under an obligation to find another market or to render some other sort of service. The whole scheme was built upon the need of the neighbours for woodwork and the need of the carpenter for other things. But now, and that is why I suggest that we are thinking upside down, the needs have disappeared from our discussion, and we talk only of the carpenter and his wages. We have allowed our carpenter, and every other supplier of everything to get into a false position. He says, in effect: "I am a carpenter. I will perform woodwork in such quantities and at such prices as shall be arranged by all my fellow carpenters in union together, and if you other people will not comply with our ideas and our requirements, if at any time you do not want our services on these terms, then we will be idle at your expense. You must continue to supply us with your products, but you can only have ours on our terms. If you do not want our products, then we will offer no others; we will wait until you see the wisdom of complying with our demands." All of which is summed up in the current phrase: "Work or maintenance."

The Governing Truth

Things are, of course, by no means as simple as this. Centuries of complications have obscured our economic foundations, but the foundations remain, and are more essential than ever by reason of the wonderful fabric that has been built upon them. The simple truth that we work for others, however completely we may forget it, and however far modern commercial methods may remove us from the others, remains and absolutely governs the whole situation. Until we get a different attitude of mind towards the consumer or the customer, our employment difficulties will continue to increase. At the moment, we have entered a period when it would seem, to judge by our conversation, as if the consumer did not exist, and there was, therefore, no need to take account of his convenience or opinions. The distance we have travelled along the wrong road is amazing; our minds cease to function, except on behalf of the worker or producer or supplier. This is noticeable not only in industrial discussion, but in every question we touch. The other day we had an official inquiry into infant mortality, but the report of the experts, who were supposed to be concerned with the lives of our infants, consisted of a number of recommendations for pensions for midwives.

Whenever we talk of work, we think of the worker and ignore the work; we think of the wages and ignore the price; in fact, we get the picture upside down.

It is commonly agreed that it takes two to make a quarrel, but usually forgotten that in this respect a quarrel differs from few of the rest of human activities. Two at least are necessary for almost any economic process. One man writes, but unless another man reads he writes in vain. The singer who fails to attract a listener is not an economic proposition, and so in all well-ordered affairs you must have a willing buyer and a willing seller. From which it follows that there must be two opposing views of every economic proposition. One side desires to be rid of an article and another desires to acquire it. It is right and proper for me as a publisher to think only of selling books and to strive to sell them on my own terms. But society must think of buying books and endeavour to modify my demands. When two forces are allowed free play in an open market, the maximum business follows, but when one or other of them secures a favoured position, an artificial and unreliable state of affairs prevails.

A Political Maze

Man does not want work; he wants the product of the work of others, and it is the failure to realise this simple but incontrovertible proposition which is the cause of much of our difficulty. We have hedged the problem round with false issues and lost our way in a sophisticated political maze. Talking to a politican about unemployment is something like talking to a Jew about transubstantiation. There is no basis upon which to argue. The politician's mind is full of constituents who want wages or of manufacturers in search of artificial aids. On the other hand, it is as useless to talk about work to a trade union official or an officer of a Labour Exchange as it would be to discuss the Totalisator with a bookmaker.

Like so many other problems that worry us, we want, for a successful solution of this one, less of the experts and more of common-sense experience. Life is much easier for us than for previous generations, because we have still further developed the processes of dividing labour and specialisation. It follows, however, that we find ourselves more and more separated as producers and consumers, and it is increasingly difficult for the producer to visualise the consumer or for the consumer to get into touch with the producer of the article he enjoys. As I delight in a cigarette, it is not easy to recognise my obligation to the miner who produced the coal which made the steam to drive the machinery which manufactured the paper to roll the tobacco in. And yet the definite obligation is there. A greater stretch of imagination is called for on the part of the miner, because his coal, for all he knows, may be wanted for baking bread or boiling soap. Nevertheless the mutual obligation is as definite and clear and irresistible as the obligation between the village carpenter and the blacksmith with whom he exchanges service. In these days of wonderful industrial organisation, we are quite naturally apt to lose sight of the other party and sometimes of the article itself, and give all our interest to the working of the great machine of which we form only an unimportant unit.

The unemployment problem is by no means entirely a working man's affair, and our errors are not by any means confined to the working classes. We are all after Safety First, and we cannot get it. It simply does not exist. It is the fashion to sentimentalise and legislate just as much for the inefficient employer as for the superfluous worker, and both processes accentuate our difficulties. A few more healthy bankruptcies would help our traders to see that safety cannot be secured by trade arrangements; it must be obtained by the harder means of satisfaction to customers.

Need for a Scientific Method

I am quite conscious of the lack of any satisfaction in this line of argument to the father of a family in search of next week's wages, or to the directors of a factory whose machinery is for the moment standing idle. Also, I recognise the plight

of a government which, in face of such circumstances, is almost forced to take some measures to avert disaster. But I protest that unless those measures are taken, with a full knowledge and understanding of the real nature of the problem, they are quite certain to make it worse. I can at least point to our recent experience for a justification of this protest. The more we do for the unemployed the more numerous they become ; as things are now arranged, every competent observer expects to see the two millions mark reached before Christmas, and if we go on forgetting the nature of work, the numbers will mount in a sort of arithmetical progression.

The sucking of an acid drop may do something to ease the pain of a sore throat, but unless the stomachic trouble of which the sore throat is only the symptom is corrected, grave harm may be done. No difficulty seems to stand in the way of a right understanding of the subjective method when the problem is concerned with science or medicine. Popular education has taught us to think rightly and to appreciate the difference between cause and effect, and we no longer mistake the symptom for the disease. Is it, therefore, entirely unreasonable to hope that our modern wisdom in these matters may now be capable of application to our economic troubles as well ? Can we not give up this last remnant of the weakness for the quack remedy and begin to think on scientific lines on unemployment and work ? Science always starts at the beginning, with a correct analysis and a formula on which reliance can be placed. Politics, by way of contrast, concerns itself with the froth or fringe and discusses the visible, more often than not without regard to what is underneath.

The whole matter can be summed up in this very simple way : If we turn our attention from the unemployed to the employed, and asked them the question : " Are you giving value ? Are you doing your best to satisfy the customer and develop the market in a sound and healthy way ? " the whole problem might assume another and more pleasant aspect.

Purification of Rivers

Admission of Trade Waste to Sewers

THE question of river pollution by liquid trade waste in Birmingham and the Black Country, where chemical and metal processes are largely carried out, has for some years past engaged the close attention of a special committee of representatives of local authorities ; and in the annual report just issued dealing with the condition of the Tame at Birmingham, it is stated that a marked improvement has taken place.

The Birmingham Joint Committee adds that the Government Advisory Committee on River Pollution has been engaged during the past year upon the thorough investigation of the subject of the admission of liquid trade waste to the sewers of local authorities, and its influence upon the question of river pollution. It is suggested that, by adopting a sympathetic attitude towards the traders upon this question, the committee have probably anticipated legislation which may be recommended in the near future to encourage the more general and consistent application of the principle of disposing of the liquid trade waste produced into the sewers of the local authorities.

During the past year three sources of pollution of the upper River Tame have been permanently removed in this desirable manner, and consent has already been given by a local authority to a trader erecting new premises to avail himself of this method of disposal of liquid trade waste.

The History of Bleaching

THE history of bleaching formed the subject of a paper by Mr. H. Johnson, and read, in the absence of the author, by Mr. W. Scholes, before the Lancashire and Cheshire Antiquarian Society. One of the earliest books on bleaching, he said, was written by James Dunbar, and published in Edinburgh in 1736 ; but in 1756 Dr. Francis Home made the first real advance in bleaching processes by the publication of his work on vitriol bleaching, the vitriol taking the place of buttermilk. In 1774 Scheele discovered chlorine, and in 1799 Charles Tennant patented his bleaching powder so that chemical bleaching could be put into general commercial use. This advent of chlorine into cotton and linen bleaching was the outstanding milestone in the history of the industry. It enabled the bleacher to ply his trade the year round and thus keep up with the growing production of textiles consequent on the introduction of mechanical spinning and weaving, and it liberated thousands of acres of land for agriculture.

Combined Steam Power and Heating

Cheap Electricity in Chemical Industries

MUCH publicity (an engineering correspondent writes) is being given to national electrification schemes and the " grid " system, but it is necessary to emphasise that in chemical works and many other establishments where low pressure and " boiling " steam is used, electricity can be generated at a very low cost. This is effected by combining the power and process steam services and avoiding the use of condensing steam engines or turbines, which have to be operated at power stations. In a number of chemical works, of which the Billingham plant of Synthetic Ammonia and Nitrates, Ltd., is a case in point, this is already in operation, but the general principles are not yet widely understood.

In any industry requiring a large amount of heating steam the proper method is to generate the steam at as high a pressure as possible, say 120–180 lb. or over, and operate non-condensing back-pressure or partial condensing pass-out engines or turbines, so that the steam, after developing power, is exhausted at any desired low pressure, say 5–30 lb. per square inch, ready for all the heating work. The engine or turbine may be coupled to an electric generator, or used for direct driving, and is operated merely by the drop in the steam pressure, without any condensation, on the same general lines in this respect as a reducing valve, utilising thereby only about 5 per cent. of the total heat in the coal. As all the remainder is available for heating, the electrical power is obtained for very much less than when using condensing units, since in the latter case the very large amount of heat in the exhaust steam is lost. Thus the overall thermal efficiency from the raw coal to the place of use of such a combined power and heating set is 50–65 per cent., whereas the most efficient electrical power station is little over 20 per cent., and the average is less than 17 per cent., and probably below 16 per cent. The cause of this great difference is that when using condensing engines or turbines about 60 per cent. of the total heat of the coal is lost in the cooling water of the condenser, due to the latent heat of steam, about 450–500 tons of water being required for every ton of coal burnt, whereas in a combined plant of the above character this heat is all usefully employed in boiling water, or drying, or similar operations.

Some striking work for example in this field is being carried out by Belliss and Morcom, Ltd., of Birmingham, one of the chief pioneers of the principle, who manufacture both back-pressure and pass-out engines and turbines. Altogether more than 1,450 installations are at work, aggregating about 300,000 h.p. in about 70 different industries in different countries of the world, representing an experience which covers almost every possible condition of process steam and power operation, while the detailed results of hundreds of plants are available, showing a saving of say 25–45 per cent. in the coal bill as compared with ordinary methods of condensing units and separate steam for process work.

Research in Business Building

"RESEARCH—the Foundation of Successful Business Building," was the title of an address delivered recently at the annual dinner of the Business Research and Management Association of Great Britain at Anderton's Hotel, Fleet Street, London. The speaker was Mr. James A. Crabtree, founder and managing director of J. A. Crabtree and Co., Ltd., who dealt with the research he had found essential in the growth of his own business—a business which, starting from scratch in 1919, now employs nearly 1,000 people. He emphasised the many-sidedness of research into every business problem of finance, technique, production, sales, and personnel. There was a wrong idea abroad that research was only a matter for the huge corporations. It was quite as important for an ordinary sized business to undertake research into its affairs as it was for the large concerns. Mr. Crabtree emphasised the important effect in his own business of his successful forecast in 1918 of the great post-war slump, and his further forecast in 1927 of the severity and approximate date of the present industrial depression. He did not seem to think that we had as yet seen the worst, but he anticipates a marked improved trend towards the middle or end of next year, which he feels will have greater promise than at any time since the war.

From Week to Week

UNIVERSITY NEWS—*Birmingham.*—Mr. J. W. Jones, M.Sc., has been appointed lecturer in metallurgy.

MAY AND BAKER, LTD., announce a reduction of twopence per lb. in the price of English refined camphor.

A NEW LABORATORY is to be provided for Raine's School, London, by the conversion of an adjoining beerhouse, which has just been bought by the trustees.

AN EXPLOSION occurred last week at Genatosan works, Derby Road, Loughborough, and damaged the roof of that part of the building where Sanatogen is made. Fortunately no one was injured and fire, which followed the explosion, was extinguished by men in the works.

PROCEEDINGS taken by the Nene and Welland Fishery Board against the Central Sugar Co., of Peterborough, for alleged pollution of the River Nene, were dismissed at Norman Cross Sessions on Tuesday. The company was ordered to give an undertaking to take effective steps to prevent depositing in the river effluent injurious to fish.

TO CONFORM with the so-called "nitrate year," Anglo-Chilean Consolidated Nitrate Corporation states, in a circular to shareholders, that the directors have voted to change the fiscal year from the calendar year to one commencing July 1, and ending June 30. After this year's meeting in May the annual meetings will henceforward be held in November.

BASIC BESSEMER STEEL is excluded from the revised British standard specification for structural steel issued by the British Engineering Standards Association on Monday. This process of steel manufacture has been discontinued in Great Britain because of the uncertain quality of the product, but it is used for approximately 90 per cent. of the steel imported from the Continent.

N.B.A., LTD., has been registered as a company to consolidate and further the interests of producers of crude and refined benzole and its homologues, or any product derived from the distillation of coal, lignite and other like substances. The management is vested in an executive committee consisting of the President (Sir David Milne-Watson) and vice-presidents and 18 members of the Association elected by districts of England, Scotland and Wales.

THE BRITISH GOVERNMENT CONTRACT to purchase the zinc concentrate output of the Broken Hill Mines, New South Wales, will not be renewed after its expiry at the end of next month. As a result, the chief companies concerned—North Broken Hill, Ltd., Broken Hill South, Ltd., and the Zinc Corporation, Ltd.—are entering into an arrangement for the disposal of their concentrate output, after June 30, to the Electrolytic Zinc Co. of Australasia, Ltd., and the Imperial Smelting Corporation, Ltd.

A NEW PHOSPHO-NITROGEN FERTILISER, obtained from a base of natural phosphates, is reported by the United States assistant trade commissioner in Paris, to have been perfected by a French engineer, a technical director of one of the Algerian mining companies. Natural phosphates are treated with hydrochloric acid in the proportion of one to one. Ammonium sulphate is then added to the clear solution, the mixture filtered in order to eliminate the precipitated calcium sulphate, and calcium carbonate is then added to the filtrate. The fertiliser manufactured in this manner contains 18 per cent. phosphoric acid, soluble in citrate, and 14½ per cent. of ammoniacal nitrogen.

TWO MORE DEATHS have taken place during the week as the result of the explosion at Bibby's oil cake mills at Liverpool on May 6, bringing the total death roll up to nine. At the resumed inquest on Wednesday the jury returned a verdict that the deaths of the victims were the result of shock due to burns caused by explosions following spontaneous combustion of sunflower and rice meal in the silos, and recommended that before any alterations to the silos were proceeded with the proposals should be submitted to the Home Office for approval. Mr. Ernest Evans, chief engineer to Bibby and Sons, said that to ensure safety in the future it was proposed to carry the silos to the roof instead of having a concrete roof over them. There would be only a light cover, so that any explosion would escape upward. Another idea was to run tubes through the material in the silos, charged with carbon dioxide, which would blanket out the fire. They would not again use the silos until they were safe.

PETER SPENCE AND SONS, LTD., will on May 26 remove their head office to National Buildings, St. Mary's Parsonage, Manchester.

RECENT WILLS include Mr. E. C. Exell, of 333, Barnsley Road, Sheffield, senior partner in Exell Brothers, manufacturing chemists (net personalty, £1,549), £1,665.

A RESOLUTION asking the executive to discuss steps to overcome the full effects of rationalisation was carried at the annual conference of the Amalgamated Society of Dyers, Bleachers, Finishers and Kindred Trades at Blackpool on Sunday.

AN EFFICIENT AND SIMPLE INCLINOMETER to satisfy the needs of geologist and driller is urgently needed in the present-day oilfield, stated Mr. D. P. Rees, in the course of a paper on "Oil Well Deviation," read before the Institution of Petroleum Technologists in London on Tuesday.

THE DYESTUFFS ACT formed the subject of a question by Sir N. Grattan-Doyle in the House of Commons on Tuesday, and in reply the President of the Board of Trade (Mr. W. Graham) stated that the policy of the Government with regard to renewal of the Act was still under consideration, but he hoped to make a statement at an early date.

THE INTER-'VARSITY METALLURGICAL CONFERENCE at Liverpool University last week discussed "The Future of the Iron and Steel Industry," the general conclusion being that rationalisation would lead to the efficient firms being made to suffer for the shortcomings of the inefficient, and that unified control by a committee of technical and economic experts would lead to more successful working.

MR. R. FIRTH, of the Society of Chemical Industry in Basle and the Clayton Aniline Company, has arrived in Melbourne to act as technical representative and adviser on dyestuffs, and will be attached to Robert Bryce and Co., who have been appointed Australian agents for the company. His work will be to assist the dyeing and textile industries generally, particularly those engaged in the use of dyes for woollen and leather goods.

SHAWINIGAN CHEMICALS, LTD., Montreal, Canada, announce that Dr. F. W. Skirrow, who has been in charge of research at Shawinigan Falls since 1919, is being transferred to London as the firm's technical representative, and is being replaced at Shawinigan by Dr. D. Douglas McIntosh, at present Professor of Chemistry at Dalhousie University. Dr. Skirrow, who expects to take up his new duties on October 1, was in 1902 chemist at the National Physical Laboratory in this country, and from 1903, until going to America in 1912, on the research staff of the Manchester Oxide Company, Manchester.

MR. J. G. JACKSON, consulting engineer, Glasgow, has returned to private consulting practice after having patented and made in conjunction with Imperial Chemical Industries what is claimed to be the fastest and safest explosive filling machine yet constructed. During the war Mr. Jackson patented the shell filling machine that was adopted as standard by all the Allied Governments. His post-war work includes the patenting and making of filling machines which solved the powder filling problem for Lever Bros., at Port Sunlight. Mr. Jackson has just perfected a new process and machine for continuously mixing powders and plastics, a problem which has been engaging the attention of many engineers since mechanical milling began.

THE TEES VALLEY WATER BILL was approved by the House of Lords Committee on Friday, May 9, a petition of Synthetic Ammonia and Nitrates, Ltd., Billingham, to be excluded from the price revision clauses, being granted. The Bill will provide power for the revision of water charges and was made necessary by the losses of the Water Board, caused partly by the enormous proportion of water required in the Tees Valley for industrial purposes. Dorman, Long's works, it was stated, took 37,000,000 gallons of water a week and Imperial Chemical Industries, Ltd., 28,000,000 gallons, and a large number of industrial consumers at present did not pay rates to make up the deficit. Counsel for the petitioning company criticised the proposed machinery for revision of charges and said the company would prefer the appointment of an arbitrator to the process of consideration by the Ministry of Health.

Obituary

MR. T. R. FERENS, managing director of Reckitts, Ltd., on May 9, aged 83. He was a great benefactor of Hull and gave £250,000 for the foundation of the University College.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

326,236. TREATING CLAY. A. L. Mond, London. From Kali-Chemie Akt.-Ges., 10, Reichstagsufer, Berlin. Application date, December 8, 1928.

Soluble sulphates in clays, etc., are rendered insoluble by means of barium compounds, and the reaction is accelerated by adding sodium chloride. Efflorescence in bricks, tiles, etc., is thus avoided.

326,256. VULCANISATION ACCELERATORS. S. J. Peachey, 44, Platts Lane, Hampstead, London. Application date, December 13, 1928.

A vulcanisation accelerator which does not stain is made by heating to 100° C. *p*-nitroso-dimethylaniline or a homologue with a primary, secondary, or tertiary aromatic amine of the benzene, naphthalene or pyridine series and sulphur.

326,263 and 326,268. DYES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 15 and 19, 1928.

326,263. Halogenated pyranthrones are treated with oxidising agents such as manganese dioxide or potassium iodate in the presence of sulphuric acid or oleum to obtain vat dyes giving brown shades on cotton.

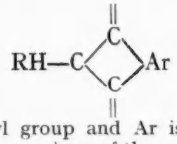
326,268. A 2-halogen-benzanthrone negatively substituted in the Bz1-position is condensed with a pyrazol-anthrone not substituted in the 2-position to obtain N.2-pyrazolanthronyl benzanthrones which have a negative substituent in the Bz1-position and the 2-position in the pyrazolanthrone radical free. These are treated with alkaline condensing agents to obtain new vat dyes which can be halogenated to obtain other shades. Thus, N.2-pyrazol-anthronyl-Bz1-nitrobenzanthrone may be obtained from pyrazolanthrone and 2-chlor-Bz1-nitrobenzanthrone and fused with alcoholic potash. The product may then be treated in nitrobenzene with sulphuryl chloride in presence of pyridine. Other examples are given.

326,378. SODIUM METABORATE. A. Kelly, 57, Chancery Lane, London. Application date, April 9, 1929.

A boron compound such as crude borax, sodium borate, Tincal or Rasorite is heated with sodium carbonate and lime in water. Sodium metaborate is obtained by filtering and crystallising.

326,467. ORGANIC COMPOUNDS. T. K. Walker and L. M. Walker, 25, Highgrove Road, Cheadle, Cheshire, H. Shaw, 29, King's Road, Hurst, Ashton-under-Lyne, and R. Black, 21, Alexander Road, Edgbaston, Birmingdam. Application date, November 12, 1928.

A mono-alkyl-malonyl halide is condensed with a hydroxy aromatic hydrocarbon derivative including derivatives of naphthalene, anthracene or other condensed ring system, with or without a solvent, in the presence of aluminium, ferric, or stannic chlorides to obtain hydrindene derivatives of the general formula



where R is an alkyl group and Ar is a hydroxy-aromatic complex. Examples are given of the condensation of *n*-butyl-malonyl chloride and *p*-cresol, *p*-cresol-methyl ether or *p*-cresyl acetate to obtain 4-methyl-7-hydroxy-2-*n*-butyl-1 : 3-diketo-hydrindene ; the condensation of *p*-cresyl acetate and *n*-propyl-malonyl chloride to obtain 4-methyl-7-hydroxy 2-*n*-propyl-1 : 3-diketo hydrindene ; the condensation of ethyl-malonyl chloride and resorcinol-dimethyl-ether to obtain 5-methoxy-7-hydroxy-2-ethyl-1 : 3-diketo-hydrindene ; the condensation of *n*-butyl-malonyl chloride and β-naphthol-methyl ether to obtain 1 : 8-*n*-butyl-malonyl-2-hydroxy-naphthalene.

326,487. DYES AND INTERMEDIATES. Sir G. C. Marks, London. From E. I. Du Pont de Nemours and Co., Wilmington, Del., U.S.A. Application date, December 8, 1928.

1-chlor-anthraquinone-2-carboxylic acid is heated with alkaline poly-sulphide and ammonia, and the resulting 1 : 9-anthra-thiazole-2-carboxylic acid converted into the chloride by means of thionyl chloride or phosphorus pentachloride. The 1 : 9-anthrathiazole-2-carboxylic chloride may be condensed with aminoanthraquinones or their derivatives, including mercapto, benzoylamino, and halogen derivatives, by heating in nitrobenzene, to obtain vat dyes giving yellow to orange shades. Examples are given of the condensation of one molecular proportion of the chloride with one molecular proportion of 1- and 2-amino-anthraquinones, monobenzoyl-1 : 5-diamino-anthraquinone, 1-amino-6-chloranthraquinone and 1-mercapto-2-amino-anthra quinone ; two molecular proportions of the chloride with one molecular proportion of 1 : 4- and 1 : 5-diamino-anthraquinone ; and one molecular proportion of the chloride with 1 : 5-diamino-anthraquinone, the product being benzoylated.

326,500. CONDENSATION OF POLY NUCLEAR COMPOUNDS WITH OLEFINES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 11, 1928.

Solid aromatic hydrocarbons containing at least three nuclei, their homologues and halogen derivatives, are condensed with olefines in the presence of catalysts such as aluminium chloride, ferric chloride, or an addition compound of aluminium chloride with olefines, at 50°—200° C. under pressure. Benzene hydrocarbons and gaseous halogen acids may also be present. The starting materials may be crude solid products obtained in the distillation of coal tar or the refining of crude anthracene, and oil gas and other gaseous mixtures obtained by cracking oil. The products are oils and resins, and examples are given of the condensation of phenanthrene, acenaphthene, and crude anthracene with propylene, phenanthrene with cyclohexene, and 5-bromacenaphthene with propylene.

326,523. INDOXYLS AND INDOLES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, November 6, 1928.

Indoxyl, naphthindoxyl, their homologues and acyl derivatives, are catalytically hydrogenated to obtain dihydroindoxyls, from which indoles are obtained by splitting off water and dihydro-indoles. Dihydro-indoxyls are obtained if the hydrogenation is effected under mild conditions, *e.g.*, ordinars temperature with or without pressure, elevated temperature, without pressure, or by working without dehydrating material and interrupting the process when two atomic proportions of hydrogen have been absorbed, in which case elevated temperature and pressure may be employed. Dihydro-indoles are obtained if the hydrogenation is effected at elevated temperature and pressure, preferably with a dehydrating agent. Catalysts containing metals of the first or eighth groups are employed, and activating additions may be made. Solvents or diluents such as water, ethyl alcohol, acetic acid, ethyl acetate or deca-hydronaphthalene may be present, as well as basic substances or salts. The subsequent splitting off of water is effected by treating with mineral or organic acids, alkalies, or salts, or by raising the temperature. The products are employed as perfumes for pharmaceutical purposes, and as dyestuff intermediates. The di-hydro-indoxyls and di-hydro-indoles are vulcanisation accelerators. The examples include hydrogenation of indoxyl to dihydro-indoxyl and di-hydro-indole, N : O-diacetyl-indoxyl to N-acetyl-dihydro-indoxyl ; N-mono-acetyl-indoxyl to N-monoacetyl-dihydro-indoxyl ; 7-methyl-N : O-diacetyl-indoxyl to 7-methyl-2 : 3-dihydro-indoxyl, and several others.

326,525. ALDEHYDE-AMINE CONDENSATION PRODUCTS. Clayton Aniline Co., Ltd., 501, Ashton New Road, Clayton, and H. Fritzsche, 37, Clyde Road, West Didsbury, both in Manchester. Application date, November 12, 1928.

Vulcanisation accelerators are obtained by the reaction of more than one molecule of aldehyde with the condensation product of a primary or secondary amine and an aldehyde-bisulphite compound, or by the reaction of the aldehyde with a mixture of the amine and the bisulphite. The amines may

be aliphatic or aromatic, and may be mono or polyamines, while aromatic amines may have substituents in the nucleus. Examples include the reaction of formaldehyde with sodium aniline methane-ω-sulphonate, acetaldehyde with sodium aniline ethane-ω-sulphonate, and croton aldehyde with sodium aniline ethane-ω-sulphonate.

326,529. FERTILISERS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, November 16, 1928.

Mixed fertilisers containing ammonium nitrate and other ingredients are made by solidification of liquid mixtures with the addition of less than 6 per cent. of substances soluble in the liquid which will increase its surface tension, such as calcium nitrate, urea and its salts, sodium nitrate, sodium sulphate, and other sodium salts. The liquid mixture is solidified by spraying.

326,533. SYNTHETIC DRUGS. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 12, 1928.

Water-soluble complex organic pentavalent antimony compounds are obtained by treating an aromatic *o*-dihydroxy compound containing an acidic group with antimony pentoxide, antimonic acid or its salts, in the presence of basic substances or with subsequent addition of basic substances to form salts. The acidic groups include carboxylic and sulphonic groups, but not nitro, chloro, bromo, cyano and like groups. The examples include the compounds obtained from potassium pyrocatechin disulphonate and antimonic acid, potassium pyrogallol disulphonate and diethyl amino-ethanol antimonate. The preparation of pyrocatechin disulphonic acid and diethylamino ethanol antimonate is also described.

326,537. SYNTHETIC DRUGS. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 13, 1928.

An amino-substituted aromatic arsenic-antimony compound in which the arsenic and antimony are directly linked with carbon or with carbon through one another, is treated with formaldehyde-bisulphite or formaldehyde and a bisulphite. Examples are given of the preparation of the formaldehyde bisulphite compounds of *m*-amino-*p*-hydroxy-p^1 amino arseno stibino-benzene, and the stibino arseno compound obtained from *m*-amino-*p*-hydroxy-phenylarsine and antimony-1 : 2-dihydroxybenzene-3 : 5-disulphonic acid.

326,539. PURIFYING FATTY OILS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 14, 1928.

Sulphur-olive and other vegetable oils are warmed and stirred with concentrated volatile acids, *e.g.*, hydrochloric, formic, or acetic acid or with organic substances generating these acids on heating, *e.g.*, acetyl chloride. Soaps of heavy metals are thereby decomposed and gummy materials precipitated. The oil is then washed several times with hot water, and then freed from water by settling, centrifugal treatment, or heating in vacuo.

326,553. SYNTHETIC DRUGS. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 17, 1928.

Dialkylamino-alkylamino derivatives of hydroxy compounds of the anthracene and phenanthrene series are obtained by converting a reactive compound of either series into a basic or more strongly basic derivative in which an aromatic amino group is connected to a dialkylamino group through an alkylene residue. In an example, 1-diethylamino-ethylamino-anthraquinone is obtained by condensing 1-bromanthraquinone with asymmetric diethyl-ethylene-diamine in the presence of pyridine and copper bronze. The product is reduced with hydro-sulphite in alcoholic solution to 1-diethylamino-ethylamino-9 : 10-dihydroxyanthracene.

326,567. MOTH-PROOFING TEXTILES, ETC. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 20, 1928.

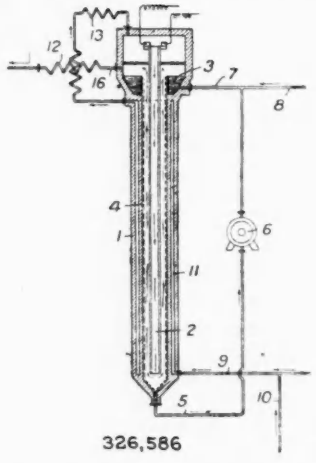
Wool, fur, hair, etc., are treated with a thiourea of the formula $S=C\langle^{NH-R}_{NH-R_1}$ in which R represents an alkyl, alkylene, cycloalkyl, aralkyl, or aryl residue, and R_1 an acid residue. R may be allyl, cyclohexyl, benzyl, phenyl, tolyl, methoxy-phenyl, chloro-tolyl, or trichloro-phenyl, and R_1 may be acetic, valeric, stearic, oleic, or benzoic, or substitution products of these acids. Thioureas containing one amino group substituted by an alkyl or other residue are obtained by the interaction of an aryl mustard oil with ammonia or the interaction of primary bases with thiocyanate, or the interaction of the dithio-carbamine acid salts with mercuric chloride. The mono-substituted ureas are dissolved in pyridine or dimethylaniline and treated with an acid chloride, *e.g.*, caproic or valeric acid chloride. After conversion, the mass is acetylated with hydrochloric acid while cooling and the thiourea filtered and recrystallised. The thiourea is dissolved in an organic solvent and employed in such strength that 1-2 per cent. remains on the fibre.

326,580. CATALYSTS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 24, 1928.

Destructive hydrogenation catalysts such as oxides or hydroxides of metals of the sixth group, *e.g.*, chromium oxide, molybdic acid or tungstic acid or sulphides, carbides, or solid metalloids, are converted into a stable, coherent form by adding a small quantity of metals of the second or third groups such as zinc, aluminium, beryllium, cadmium, or the earth metals of these groups or alloys or carbides. The additions are thoroughly mixed with an aqueous paste of the catalyst, which is then gradually dried. An example is given.

326,586. DESTRUCTIVE HYDROGENATION. W. R. Tate and H. P. Stephenson, Norton Hall, The Green, Norton-on-Tees, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, December 31, 1928.

Oil or liquid pastes of carbonaceous materials are fed through a pipe 7 to an annular trough 3 from which they overflow down the sides of a cylindrical chamber in a film 4. The material is re-circulated by a pump 6. Hydrogen is supplied



326,586

through a pipe 9 and is circulated through an annular chamber 11 and heat exchanger 12, the latter being heated by reaction products drawn off through pipe 16. The hydrogen then passes through a heater 13 and down through a tubular heating element 2, and then upward in counter-current over the descending film 4. The gas drawn off is freed from condensible constituents, and the hydrogen returned to the pipe 9. Some modifications are described.

326,642. AMMONIUM CHLORIDE. Imperial Chemical Industries, Ltd., Millbank, London, and C. W. Bunn, Winnington Hall, Northwich, Cheshire. Application date, February 23, 1929.

Uniform small crystals of ammonium chloride are obtained by crystallising a solution to which is added a small proportion of a substance which can form mixed crystals or a double salt, such as chloride of manganese, iron, cobalt, nickel or copper.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—299,419 (Selden Co.), relating to purification of crude aromatic hydrocarbons, see Vol. XIX, p. 640; 303,520 (I.G. Farbenindustrie Akt.-Ges.) relating to carbazole derivatives, see Vol. XX, p. 234; 303,755 (A. Pacz), relating to

aluminium and alloys, see Vol. XX, p. 31 (Metallurgical Section); 303,808 (I.G. Farbenindustrie Akt.-Ges.) relating to decomposition products from iron sulphate, see Vol. XX, p. 259; 303,901 (I.G. Farbenindustrie Akt.-Ges.), relating to hydroxy carboxylic acids of carbazole, see Vol. XX, p. 259; 306,046 (I.G. Farbenindustrie Akt.-Ges.), relating to alkali nitrates, see Vol. XX, p. 411; 307,471 (I.G. Farbenindustrie Akt.-Ges.), relating to ethyl acetate, see Vol. XX, p. 479; 308,681 (Rheinische Kampfer-Fabrik Ges.), relating to thymol and its isomers, see Vol. XX, p. 524; 312,648 (C. R. Beringer), relating to zinc white pigments, see Vol. XXI, p. 114; 315,768-9 (K. Fredenhagen), relating to electrolytic manufacture of fluorine, see Vol. XXI, p. 266.

Specifications Accepted with Date of Application

304,796–7. Hydrogenation and distillation of hydrocarbon oils and other carbonaceous material. Standard Oil Development Co. January 26, 1928.

305,592. Vat dyestuffs of the indigo series, Manufacture of. I.G. Farbenindustrie Akt.-Ges. February 7, 1928.

306,531. Cellulose acetate, Manufacture of. U.S. Industrial Alcohol Co. February 24, 1928.

307,890. Nitroso-diazo solutions, Production of. I.G. Farbenindustrie Akt.-Ges. March 15, 1928.

307,939. Ammoniacal copper cellulose solutions, Manufacture of. K. Hess and C. Trogus. March 16, 1928. Addition to 301,752.

308,730. Vat dyestuff preparations. J. R. Geigy. March 27, 1928.

319,656. Chemically pure phosphoric acid, Production of. I.G. Farbenindustrie Akt.-Ges. September 25, 1928.

328,197. Glutinous products, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) December 22, 1928. Addition to 313,101.

328,210. Aromatic amines, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) January 18, 1929.

328,211. Alkali fluorides, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) January 18, 1929.

328,212. Double compounds of the acridine series, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) January 18, 1929.

328,220. Aromatic hydroxy derivatives, Sulphonation of. Major and Co., Ltd., and H. H. Hinchliffe. January 19, 1929.

328,241. Silica-gel, Preparation of. A. P. Okatoff. October 23, 1928.

328,248. Vat dyestuffs of the anthraquinone series, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) January 12, 1929.

328,272. Potassium nitrate, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) December 12, 1928.

328,276. Deacidification and bleaching of oils and fats. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) December 24, 1928.

328,291. Azine dyestuffs, Manufacture of. O. Y. Imray. (*I.G. Farbenindustrie Akt.-Ges.*) January 18, 1929.

328,292. Azo dyestuffs, Manufacture of. Major and Co., Ltd., and H. H. Hinchliffe and W. J. Darby. January 19, 1929.

328,334. Vat dyestuffs, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) November 27, 1928. Addition to 307,328.

328,357. Polymethine dyestuffs, Manufacture of. R. Kuhn and A. Winterstein. February 13, 1929.

328,383. Dyestuffs, Preparation of. O. Y. Imray. (*I.G. Farbenindustrie Akt.-Ges.*) March 12, 1929.

328,388. Washing gas liquors, Process for. A. L. Mond. (*I.G. Farbenindustrie Akt.-Ges.*) March 15, 1929.

328,418. *m*-2-xylidine, Manufacture of. Imperial Chemical Industries, Ltd., and L. J. Allchin. April 11, 1929.

328,485. Coating aluminium, magnesium, and their alloys with oxides of manganese. Sprenger Patentverwertung Dr. O. Jirotka and B. Jirotka. June 4, 1929. Addition to 314,769.

328,486. Device for mechanically emptying superphosphate chambers. J. Zathey and Towarzystwo Zahladow Chemicznych Strem Spolka Akcyjna. June 4, 1929.

327,860. Dyestuffs, Manufacture and use of. British Celanese, Ltd., G. H. Ellis, H. C. Olfin, and E. W. Kirk. August 1, 1928.

328,309. Purifying hydrocarbon distillates. R. C. Osterstrom. October 9, 1928.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Anglo-Persian Oil Co., Ltd., Coxon, G. H., and Dunstan, A. E. Treatment of hydrocarbon liquids. 13,952. May 6.

Baird, W., and Imperial Chemical Industries, Ltd. Derivatives of polyhydric-alcohol-polybasic acid condensation products. 13,881, 13,882. May 6.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of reduction products of anthranthrones. 13,955. May 6.

—— Manufacture of dianthrimides. 13,956. May 6.

—— Manufacture of vat dyestuffs. 14,390. May 9.

—— Manufacture of hydroxydiphenylindole derivatives. 14,483. May 10.

Chemische Fabrik vorm. Sandoz. Manufacture of easily-soluble salts of benzyl-morphia. 14,040. May 7. (Germany, May 24, 1929.)

Coley, H. E. Apparatus for production of zinc, etc. 14,165. May 8.

—— Manufacture of zinc, etc. 14,305. May 9.

Groves, W. W., and I.G. Farbenindustrie Akt.-Ges. Purification of sulphuric acid. 13,915. May 6.

—— Manufacture of aromatic condensation products. 14,033. May 7.

Hofwimmer, F. Production of nitro substances of aromatic combinations. 14,161. May 8. (Austria, September 23, 1929.)

—— Nitrating process. 14,162. May 8. (Austria, January 17.)

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of vat dyestuffs of the anthraquinone acridone series. 13,738. May 5.

—— Apparatus for carrying out distillations. 13,898. May 6.

—— Manufacture of wax-like masses. 13,899. May 6.

—— Manufacture of polymerisation products. 13,900. May 6.

—— Manufacture of monoethers of glycols. 13,901. May 6.

—— Manufacture of polymerisation products of diolefines. 14,069. May 7.

—— Manufacture of condensation products of the anthraquinone series. 14,070. May 7.

—— Manufacture of acetylene. 14,214. May 8.

—— Preparation of vulcanisation products from rubber. 14,215. May 8.

—— Manufacture of alkylene cyanhydrins. 14,216. May 8.

—— Manufacture of modified castor oil. 14,330. May 9

—— Production of quartz mirrors. 14,453. May 10.

—— Production of aldehydes, etc. 14,450. May 10.

I.G. Farbenindustrie Akt.-Ges. Manufacture of naphthalene derivatives. 13,795. May 5. (Germany, May 3, 1929.)

—— Purification of sulphuric acid. 13,915. May 6.

—— Producing homogeneous extracts of drying-agents. 13,824. May 5. (Germany, June 14, 1929.)

—— Manufacture of hydrocarbons containing halogen-methyl. 14,034. May 7. (Germany, May 8, 1929.)

—— Manufacture of vat dyestuffs of dibenzopyrene quinone series. 14,035. (March 23, 1929.)

—— Dehydration. 14,072. May 7. (February 15, 1929.)

—— Manufacture of cellulose esters. 14,199. May 8. (Germany, May 8, 1929.)

—— Photographic printing. 14,200, 14,201. May 8. (Germany, May 8, 1929.)

—— Manufacture of vat dyestuffs. 14,350. May 9. (Germany, May 10, 1929.

—— Manufacture of artificial resins. 14,351. May 9. (Germany, May 13, 1929.)

Imperial Chemical Industries, Ltd. Derivatives of polyhydric-alcohol-polybasic acid condensation products. 13,881, 13,882. May 6.

—— Operating coke-oven plant. 14,025. May 7.

—— Welding-rods. 14,026. May 7.

—— Production of water gas. 14,303. May 9.

Jourdan, F. Extracting potash and alumina from leucite. 13,818. May 5. (Italy, February 7.)

Koppers Akt.-Ges., H. Production of ammonium sulphate. 13,958. May 6. (Germany, May 21, 1929.)

Union Chimique Belge Soc. Anon. Ammonia soda process. 13,819. May 5. (Belgium, May 7, 1929.)

I.C.I. Activity in Far East

MR. GRANVILLE WOODWARD, U.S.A. Assistant Trade Commissioner at Shanghai, reports that there is no evidence of any abatement of the vigorous campaign carried on in 1929 by the representatives of Imperial Chemical Industries, Ltd. The widespread ramifications of agencies and sub-agencies which has been built up for the sale of heavy chemicals and fertilisers is utilised for the distribution of dyes and indigo, an operating consideration of significance in so far as flexibility in connection with selling programmes is concerned.

A report from the same quarter states that the Shanghai dye and indigo market is in a somewhat nervous and uncertain state in anticipation of price changes resulting from the aggressive attitude being adopted by two of the larger operators. The present tendency of dealers is to hold off buying until the market steadies or until new prices are fixed. French interests are exhibiting an aggressive attitude and Italian dyes are again in evidence.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID, CHROMIC.—1s. 0⅝d. per lb. d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot £20 to £25 per ton, makers' works according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8½d. per lb. d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35%.—Spot, £7 10s. per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.

CALCIUM CHLORIDE (SOLID).—Spot, £4 15s. to £5 5s. per ton d/d in drums.

CHROMIUM OXIDE.—9¾d. and 10¼d. per lb. according to quantity d/d U.K.

CHROMETAN.—Crystals, 3¾d. per lb. Liquor, £18 15s. per ton d/d U.K.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4⅜d. per lb. nett d/d U.K. spot; ground ¼d. per lb. extra.

POTASSIUM CHLORATE.—3⅞d. per lb., ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8¼d. per lb. d/d U.K.

SALAMMONIAC.—Firsts lump, spot, £42 10s. per ton d/d station in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 7s. 6d. per ton d/d station in bulk.

SODA ASH, 58° E.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77%.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2 cwt. bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS.—3⅝d. per lb. nett d/d U.K. spot. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3½d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d address in bags.

SODIUM SULPHIDE CONC. SOLID.—Spot, £10 5s. per ton d/d in drums. Crystals—Spot, £7 10s. per ton d/d in sellers' casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs Commercial—Spot, £9 per ton, d/d station.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—7d. to 7½d. per lb. Crude 60's, 2s. 5d. April-June, 2s. 4d. July-Dec. per gall.

ACID CRESYLIC 99/100.—2s. 2d. to 2s. 6d. per gall. Pure, 5s. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. 98%, 2s. to 2s. 2d. Dark, 1s. 6d. to 1s. 9d. Refined, 2s. 7d. to 2s. 10d. per gall.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5¼d. per gall. 1100, 5¼d. to 6d. per gall.; 1110, 6d. to 6½d. per gall. Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 9d. to 1s. 11d. per gall.; Pure, 1s. 11d. to 2s. 3d. per gall.

TOLUOLE.—90%, 1s. 9d. to 2s. 1d. per gall. Firm. Pure, 1s. 11d. to 2s. 5d. per gall.

XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, for Export, 6¼d. to 6⅝d. per gall. Home, 4d. per gall. d/d. Middle oil, 4¼d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 1¼d. to 1⅜d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8⅛d. to 8¼d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 6d. per gall. Solvent 90/190, 1s. to 1s. 2½d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £4 10s. per ton. Hot pressed, £8 per ton.

NAPHTHALENE.—Crystals, £12 5s. per ton. Purified Crystals, £14 10s. per ton. Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 46s. to 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—3s. 9d. per lb. 100% d/d buyer's works.

ACID H.—2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 6d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—2s. 7d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—8½d. per lb. 100% d/d buyer's works.

ANILINE OIL.—8½d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—8½d. per lb. d/d buyer's works.

BENZALDEHYDE.—1s. 8d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—2s. 4d. per lb. 100% d/d buyer's works.

BENZOIC ACID.—1s. 8½d. per lb. d/d buyer's works.

o-CRESOL 30/31° C.—£3 1s. 10d. per cwt., in 1 ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots d/d.

p-CRESOL 32/34° C.—2s. per lb., in ton lots d/d.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 9½d. per lb., drums extra d/d buyer's works.

DINITROBENZENE.—8d. per lb.

DINITROCHLORBENZENE.—£74 per ton d/d.

DINITROTOLUENE.—48/50° C., 7½d. per lb.; 66/68° C., 9d. per lb.

DIPHENYLAMINE.—1s. 8d. per lb. d/d buyer's works.

a-NAPHTHOL.—1s. 11d. per lb. d/d buyer's works.

B-NAPHTHOL.—£65 per ton in 1 ton lots, d/d buyer's works.

a-NAPHTHYLAMINE.—1s. per lb. d/d buyer's works.

B-NAPHTHYLAMINE.—2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—5s. 11d. per lb.

m-NITRANILINE.—2s. 6d. per lb. d/d buyer's works.

p-NITRANILINE.—1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—6½d. per lb, 5-cwt. lots, drums extra, d/d buyer's works.

NITRONAPHTHALENE.—9d. per lb.

R. SALT.—2s. per lb. 100% d/d buyer's works.

SODIUM NAPHTHIONATE.—1s. 6½d. per lb. 100% d/d buyer's works.

o-TOLUIDINE.—8d. per lb., drums extra, d/d buyer's works.

p-TOLUIDINE.—1s. 9d. per lb. d/d buyer's works.

m-XYLIDINE ACETATE.—3s. 1d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

WOOD CREOSOTE.—1s. 9d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 8d. to 1s. 10d. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity.

CARBON BLACK.—4 1/16d. to 4½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 6d. per lb.

LITHOPONE, 30%.—£20 to £22 per ton.

SULPHUR.—£9 10s. to £13 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£55 to £60 per ton.

ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton, ex wharf London, barrels free.

ACID, ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity.

ACID, BENZOIC B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, £32 per ton; powder, £36 per ton; For one ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 7d. to 1s. 8d. per lb., less 5%.

ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.

ACID, MOLYBDIC.—5s. 3d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.

ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 2¾d. per lb., less 5%.

ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.

AMIDOL.—7s. 6d. to 9s. per lb., d/d.

AMIDOPYRIN.—7s. 9d. to 8s. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.

AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.

AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.

ATROPHINE SULPHATE.—9s. per oz.

BARBITONE.—5s. 9d. to 6s. per lb.

BENZONAPHTHOL.—3s. to 3s. 3d. per lb .spot.

BISMUTH CARBONATE.—7s. 6d. per lb.

BISMUTH CITRATE.—7s. 6d. per lb.

BISMUTH SALICYLATE.—7s. 3d. per lb.

BISMUTH SUBNITRATE.—6s. 6d. per lb.

BISMUTH NITRATE.—Cryst. 5s. per lb.

BISMUTH OXIDE.—9s. 6d. per lb.

BISMUTH SUBCHLORIDE.—9s. 9d. per lb.

BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.

BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 11½d. per lb.; 12 W. Qts. 10d. per lb.; 36 W. Qts. 9d. per lb.

BORAX B.P.—Crystal, £21 per ton; powder, £22 per ton; For one ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

BROMIDES.—Ammonium, 1s. 10d. per lb.; potassium, 1s. 5½d. per lb.; granular, 1s. 4¾d. to 1s. 5¼d. per lb.; sodium, 1s. 8d. per lb. Prices for 1 cwt. lots.

CALCIUM LACTATE.—B.P., 1s. 3d. to 1s. 6d. per lb., in 1-cwt. lots.

CAMPHOR.—Refined flowers, 3s. 3d. to 3s. 4d. per lb., according to quantity; also special contract prices.

CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.

CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.

CREOSOTE CARBONATE.—6s. per lb.

ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity; other graviti es at proportionate prices.

FORMALDEHYDE ' 40%.—37s. per cwt., in barrels, ex wharf.

GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.

HEXAMINE.—2s. 3d. to 2s. 6d. per lb.

HOMATROPINE HYDROBROMIDE.—30s. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.

HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.

IRON AMMONIUM CITRATE.—B.P., 2s. 5d. per lb. for 28 lb. lots. Green, 3s. 1d. per lb. U.S.P., 2s. 4d. to 2s. 7d. per lb.

IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.

IRON QUININE CITRATE.—B.P., 8½d. to 8¾d. per oz., according to quantity.

MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.

MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.

MENTHOL.—A.B.R. recrystallised B.P., 17s. per lb. net; Synthetic, 9s. 6d. to 11s. 9d. per lb.; Synthetic detached crystals, 9s. 6d. to 11s. per lb., according to quantity; Liquid (95%), 9s. per lb.

MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.

METHYL SALICYLATE.—1s. 3d. to 1s. 5d. per lb.

METHYL SULPHONAL.—18s. 6d. to 20s. per lb.

METOL.—9s. to 11s. 6d. per lb. British make.

PARAFORMALDEHYDE.—1s 9d. per lb. for 100% powder.

PARALDEHYDE.—1s. 4d. per lb.

PHENACETIN —3s. 9d. to 4s. 1d. per lb.

PHENAZONE.—5s. 11d. to 6s. 1½d. per lb.

PHENOLPHTHALEIN.—5s. 6d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—97s. per cwt., less 2½ per cent.

POTASSIUM CITRATE.—B.P.C., 2s. 3d. per lb. in 28 lb. lots. Smaller quantities 1d. per lb. more.

POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125 lb. kegs

POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.

POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 5½d per lb., spot.

QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins

RESORCIN.—2s. 10d. to 3s. per lb., spot.

SACCHARIN.—43s. 6d. per lb.

SALOL.—2s. 3d. to 2s. 6d. per lb.

SODIUM BENZOATE B.P.—1s. 9d. per lb. for 1-cwt. lots.

SODIUM CITRATE, B.P.C., 1911, AND U.S.P. VIII.—1s. 11d. per lb., B.P.C. 1923, and U.S.P. IX—2s. 3d. per lb. Prices for 28 lb. lots. Smaller quantities 1d. per lb. more.

SODIUM FERROCYANIDE.—4d. per lb., carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—95s. to 100s. per cwt. Crystals, 5s. per cwt. extra.

SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.

SODIUM SULPHIDE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.

SULPHONAL.—9s. 6d. to 10s. per lb.

TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.

THYMOL.—Puriss, 8s. 3½d. to 9s. 2d. per lb., according to quantity. Firmer. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.

AUBEPINE (EX ANETHOL).—12s. per lb.

AMYL ACETATE.—2s. 6d. per lb.

AMYL BUTYRATE.—5s. per lb.

AMYL CINNAMIC ALDEHYDE.—12s. per lb.

AMYL SALICYLATE.—3s. per lb.

ANETHOL (M.P. 21/22° C.).—6s. 6d. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.

BENZYL BENZOATE.—2s. 6d. per lb.

CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.

COUMARIN.—12s. per lb.

CITRONELLOL.—10s. per lb.

CITRAL.—8s. per lb.

ETHYL CINNAMATE.—6s. 6d. per lb.

ETHYL PHTHALATE.—2s. 9d. per lb.

EUGENOL.—9s. 6d. per lb.

GERANIOL (PALMAROSA).—20s. per lb.

GERANIOL.—7s. 6d. to 10s. per lb.

HELIOTROPINE.—6s. 6d. per lb.

ISO EUGENOL.—11s. 9d. per lb.

PHENYL ETHYL ACETATE.—11s. per lb.

PHENYL ETHYL ALCOHOL.—9s. 6d. per lb.

RHODINOL.—46s. per lb.

SAFROL.—2s. per lb.

TERPINEOL.—1s. 6d. per lb.

VANILLIN, EX CLOVE OIL.—13s. 6d. to 15s. per lb. Ex Guaiacol, 12s. 6d. to 13s. 9d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. per lb.

ANISE OIL.—4s. 3d. per lb.

BERGAMOT OIL.—10s. 9d per lb.

BOURBON GERANIUM OIL.—20s. per lb.

CAMPHOR OIL, WHITE.—16os. per lb.

CANANGA.—Java, 9s. 6d. per lb.

CASSIA OIL, 80/85%.—4s. 9d. per lb.

CINNAMON OIL LEAF.—7s. 9d. per oz.

CITRONELLA OIL.—Java, 2s. 8d. per lb., c.i.f. U.K. port; pure, Ceylon, 2s. 8d. per lb.

CLOVE OIL (90/92%).—7s. 3d. per lb.

EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 9d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, 11s. 6d. per lb.

LEMON OIL.—5s. 9d. per lb.

LEMONGRASS OIL.—4s. per lb.

ORANGE, SWEET.—11s. per lb.

PEPPERMINT.—Wayne County, 14s. per lb.; Japanese, 6s. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, May 14, 1930.

BUSINESS has been about up to the average of previous weeks with little of outstanding importance to report, and prices continuing on the whole firm.

General Chemicals

ACETONE.—In steady request with the market ruling firm at £71 10s. to £80 per ton according to quantity.

ACETIC ACID.—There has been a fairly substantial demand with prices unchanged at the firm rates of £36 10s. for technical 80% and £37 10s. for 80% edible.

ACID CITRIC.—Shows no improvement, and the demand is only for small lots with the market a little steadier at about 1s. 9d. per lb. less 5%.

ACID LACTIC.—A fair amount of business with prices unchanged at £42 per ton for 50% by weight, pale quality.

ACID OXALIC.—Firm at £30 7s. 6d. to £32 per ton, according to quantity, with an improved demand.

ALUMINA SULPHATE.—In good request with prices firm at £8 to £8 15s. per ton for 17/18% iron free quality.

ARSENIC.—There is no improvement in the demand, and the market is easy at about £15 15s. per ton free on rails at the mines.

CREAM OF TARTAR.—A little more inquiry, and the market is steady at about 90s. per cwt.

COPPER SULPHATE.—Quotations have been slightly firmer during the past few days and demand is improving. Present price about £21 10s. to £22 10s. per ton, free on rails London.

FORMALDEHYDE.—A fair amount of business passing with price unchanged at £33 10s. per ton.

LEAD ACETATE.—The market is now steadier, and a fair business has been booked. White quality is quoted at £40 5s. and brown at £39 5s.

LEAD NITRATE.—In quiet request at about £33 per ton.

LITHOPONE.—Unchanged at £19 15s. to £23 per ton, according to grade and quantity.

CARBONATE OF POTASH.—96/98%, technically free from arsenic, firm at £27 per ton.

PERMANGANATE OF POTASH.—In steady request at 5½d. per lb. for the B.P. quality.

SODA BICHROMATE.—Unchanged at 3⅞d., at which there is a regular market.

SODIUM HYPOSULPHITE.—The demand for photographic crystals is increasing, with price firm at £14 15s. per ton. Commercial quality in steady request at £8 10s. to £9.

SULPHIDE OF SODA.—Unchanged.

TARTAR EMETIC.—Only in small demand at about 11d. per lb.

ZINC SULPHATE.—Unchanged at about £13 per ton.

Coal Tar Products

There is no great change to report in the market for coal tar products from last week.

MOTOR BENZOL.—Remains at about 1s. 5½d. to 1s. 6½d. per gallon, f.o.r.

SOLVENT NAPHTHA.—Quoted at about 1s. 2½d. to 1s. 3d. per gallon, f.o.r.

HEAVY NAPHTHA.—Unchanged at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL.—Remains at 3d. to 3½d. per gallon, f.o.r. in the North, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Quoted at 2s. per gallon for the 98/100% quality, and at 1s. 10d. per gallon, ex works for the dark quality 95/97%.

NAPHTHALENES.—The firelighter quality is quoted at £3 10s. to £3 15s. per ton, the 74/76 quality at £4 to £4 5s. per ton, and the 76/78 quality at about £5 per ton.

PITCH.—Quoted at a nominal figure of 45s. to 47s. 6d. per ton, f.o.b. East Coast port, with little demand for this season's shipment.

Nitrogen Fertilisers Market

Sulphate of Ammonia.—Export.—The demand for sulphate has quietened down, but the price remains at £7 15s. per ton, f.o.b. U.K. port in single bags. It is expected that the sales in Central Europe will show a considerable advance on those of last year. *Home.*—Now that the season has come to an end, the demand has fallen off. It is reported that the demand from Ireland has continued well into May.

Nitrate of Soda.—Although deliveries during March and April appear satisfactory, the total deliveries from July to April show a fall of about 250,000 tons on those of last year. It is hardly to be expected that any of this leeway will be made up. To prevent further accumulation of stocks, production has been reduced. It remains to be seen if the present proposals to rationalise the industry will result in any increase in consumption.

Latest Oil Prices

LONDON, May 14.—LINSEED OIL firm and 12s. 6d. to 15s. higher forward. Spot, ex mill, £41; May, £38 17s. 6d.; June-August, £38 10s.; and September-December, £37 12s. 6d., naked. RAPE OIL was inactive. Crude, extracted, £37 10s.; technical refined, £39, naked, ex wharf. COTTON OIL was dull. Egyptian crude, £29; refined, common edible, £34; and deodorised, £36, naked, ex mill. TURPENTINE quiet and 6d. to 3d. per cwt. lower. American, spot, 39s.; June, 39s. 3d.; July-December, 39s. 9d.; Russian, spot, 36s. 6d.

HULL.—LINSEED OIL.—Spot, £40 5s.; May, unquoted; June-August, £38 15s.; September-December, £38 2s. 6d. per ton, naked. COTTON OIL.—Egyptian, crude spot, £28 10s.; edible refined spot, £31 10s.; technical spot, £31 5s.; deodorised spot, £33 10s. per ton, naked. PALM KERNEL OIL.—Crude, 5½ per cent. spot, £31 10s. per ton, naked. GROUNDNUT OIL.—Crushed-extracted spot, £32 10s.; deodorized spot, £36 10s. per ton. SOYA OIL.—Extracted spot and crushed, spot, £30; deodorized spot, £33 10s.; per ton. RAPE OIL.—Crushed-extracted spot, £36 10s.; refined, spot, £38 10s. per ton. TURPENTINE.—Spot, 42s. per cwt. CASTOR OIL.—Pharmaceutical spot, 45s. 6d.; first, 40s. 6d.; second, 38s. 6d. per cwt. net, in barrels. COD OIL.—Spot, 30s. 6d.

South Wales By-Products

SOUTH WALES by-product activities remain unsatisfactory. Pitch continues to have a poor market, the only feature of interest in the product at present being a fair inquiry for deliveries at the end of the year. Prices are unchanged round about 47s. per ton. Road tar has a slightly better call, with values ruling from 12s. to 14s. per 40-gallon barrel. Heavy naphtha has a poor call, while solvent is in moderate request. Quotations for both products are unchanged. Sulphate of ammonia is quiet. Refined tars are slightly better with quotations for gasworks and coke-oven tar unchanged. Motor benzol continues to be in moderate demand, but creosote remains weak. Patent fuel and coke exports are moderate. Patent fuel quotations for export are: 22s., ex ship Cardiff; 21s., ex ship Newport, and from 20s. to 21s., ex ship Swansea. Coke prices are: 36s. to 37s. best foundry; 30s. to 32s. 6d. good foundry, and from 25s. to 27s. 6d. for furnace.

Scottish Coal Tar Products

WHILE trading has been a little better during the week, there has been no alteration in values, which remain easy. Motor benzol is firm in tone and spot lots are scarce in this area.

Cresylic Acid.—The market is quiet with quotations unaltered. Pale 99/100% is 1s. 10½d. to 1s. 11½d. per gallon; pale 97/99%, 1s. 9½d. to 1s. 10½d. per gallon; dark 97/99%, 1s. 8¼d. to 1s. 9¼d. per gallon; high boiling, 1s. 9d. to 1s. 11d. per gallon; all f.o.r. works, in buyers' packages.

Carbolic Sixties.—Available supplies command without difficulty the equivalent of about 2s. 4d. to 2s. 6d. per gallon for ordinary quality.

Creosote Oil.—Trading is dull and prices are nominal as follows:—Specification oil, 3d. to 3¼d. per gallon; gas works ordinary, 2⅞d. to 3⅛d. per gallon; washed oil, 3d. to 3¼d. per gallon; all ex works.

Coal Tar Pitch.—Stocks are low in this district and prices are nominal at about 47s. 6d. per ton f.a.s. Glasgow for export and about 50s. to 52s. 6d. per ton f.o.r. works for the home market.

Blast Furnace Pitch is moving quietly at the fixed prices of 30s. per ton f.o.r. works for home and 35s. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—The demand is slightly better, but no alteration in value can be reported. Makers' quotations are about 3½d. to 4d. per gallon, ex works in buyers' packages.

Blast Furnace Tar is 2¾d. per gallon ex works.

Crude Naphtha.—Production is small and value is easy at about 4d. to 4½d. per gallon, f.o.r. makers' works.

Water White Products.—There is very little demand for solvents which remain at 1s. 2d. to 1s. 3d. per gallon for 90/160 and 1s. to 1s. 1d. per gallon for 90/190. Motor benzole is steady at 1s. 6¼d. to 1s. 6¾d. per gallon.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, May 14, 1930.

DURING the past week business in the heavy chemical market has again quietened down so far as actual orders are concerned. A good number of inquiries are being received, however, both for home consumption and export. Prices remain on the same level as last reported.

Industrial Chemicals

ACETONE, B.G.S.—£71 10s. to £80 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID, ACETIC.—This material is still scarce for immediate supply but prices remain unchanged as follows: 98/100% Glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports. 80% pure, £37 10s. per ton, ex wharf. 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £32 per ton, packed in bags, carriage paid U.K. stations. There are a few fairly cheap offers made from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC, 80° QUALITY.—£24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer at the same price, viz.: 3½d. per lb., ex store. Offered from the Continent at 3¼d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton, ex works for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC B.P. CRYSTALS.—Quoted 1s. 4d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. 4½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted at round about £7 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f., U.K. ports. Crystal Meal about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 7½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f., U.K. ports.

ANTIMONY OXIDE.—Rather easier and spot material now obtainable at round about £34 per ton, ex wharf. On offer for prompt shipment from China at about £30 per ton, c.i.f., U.K. ports.

ARSENIC, WHITE POWDERED.—Quoted £18 per ton, ex wharf, prompt shipment from mines. Spot material still on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £11 per ton, c.i.f., U.K. ports. For Continental material our pirce would be £10 per ton, f.o.b., Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacture contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price £4 15s. per ton to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE 40%.—Now quoted £35 per ton, ex store. Continental material now on offer at about £34 per ton, ex wharf.

GLAUBER SALTS.—English material, quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—Price now £37 10s. per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD, ACETATE.—White crystals quoted round about £39 to £40 per ton, ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 O.P. quoted 1s. 4d. per gallon, less 2% delivered.

POTASSIUM BICHROMATE.—Quoted 4⅜d. per lb. delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer at £26 10s. per ton, ex store. Offered from the Continent at £25 5s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE.—99¾/100% Powder. Quoted £25 10s. per ton, ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted at 7d. per lb., ex store. Offered for prompt delivery from the continent at about 6¾d. per lb., ex wharf.

SODIUM BICARBONATE.—Refined recrystallised £10 10s. per ton, ex quay or station, M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3⅝d. per lb., delivered buyer's premises with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, 27s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay minimum four-ton lots with various reductions for contracts.

SODIUM CAUSTIC.—Powdered, 98/99%, £17 10s. per ton in drums; £18 15s. per ton in casks. Solid, 76/77%, £14 10s. per ton in drums; £14 12s. 6d. per ton for 70/72% in drums, all carriage paid buyers' stations, minimum four-ton lots. For contracts 10s. per ton less.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum four-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Chilean producers are now offering at £10 2s. per ton, carriage paid buyers' sidings, minimum five-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices 55s. per ton, ex works, 57s. 6d. per ton delivered for unground quality. Ground quality, 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid, 61/62%, £9 15s.; broken, 60/62%, £10 15s. per ton; crystals, 30/32%, £7 17s. 6d. per ton, all delivered buyers' works on contract minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £9 5s. per ton, ex store.

ZINC.—Chloride 98%.—British material offered at round about £20 per ton f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £10 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Current Spanish Superphosphate Production

IT is estimated that 22 Spanish companies produce annually about 1,300,000 tons of superphosphate. The names of the companies, their location and annual production are given below:—

Barran y Cia, Mongat (Barcelona), 25,000 tons; Cia. Navarra de Abonos Quimicos, Pamplona, 33,000 tons; Cia. Transmediterranea, Porto-Pi (Mallorca), 40,000 tons; Estefania, Ernesto, Vallecas (Madrid), 10,000 tons; Fosfatos de Logrosan, S.A. Logrosan (Caceres), and Villanueva de la Serena (Badajoz), 60,000 tons; Establecimientos Grillard, S.A. Mongat (Barcelona), 30,000 tons; Hijos de Mirat, Salamanca, 20,000 tons; Hijos de Pio Ramirez, Salamanca, 6,000 tons; La Destiladora, S.A., Palma de Mallorca, 32,000 tons; Industrias Quimica de Castilla, Valdestillas (Valladolid), 18,000 tons; La Industrial Quimica de Zaragoza, Zaragoza), 45,000 tons; Francisco Niederleytner, Silla (Valencia), 12,000 tons; Jose Antonio Noguera, Valencia, 60,000 tons; Productos Quimicos de Huelva, Huelva, 60,000 tons; Real Cia. Asturiana de Minas, San Juan de Nieva (Asturias), 40,000 tons; San Carlos, S.A., Vasco Andaluza, Malaga, 20,000 tons; Seville, 45,000 tons; Sociedad Anonima Carrillo, Atarfe (Granada), 20,000 tons; Sociedad Anonima Cros, Badalona (Barcelona), 100,000 tons; Alicante (two factories), 44,000 tons; Malaga, 31,000 tons; Seville, 60,000 tons; Santander, 40,000 tons; Valencia, 62,000 tons; Lerida, 30,000 tons; Union Espanola de Explosivos (P.Q. y A. M.), Aldea Moret (Caceres), 30,000 tons; Badalona (Barcelona), 30,000 tons; Cartagena, 60,000 tons; Madrid, 15,000 tons; Seville, 10,000 tons; Luchana (Vizcaya), 40,000 tons; Manjoya (Oviedo), 15,000 tons; Sociedad Metalurgica di Penarroya, Pueblo Nuevo del Terrible, 50,000 tons; Sociedad Navarra de Industries, Lodosa, 21,000 tons.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, May 15, 1930.

Although it is very doubtful if business in the bread-and-butter lines of chemical products on this market during the past week has been of any bigger volume than during either of the two preceding weeks, there seems to have been a somewhat more cheerful air about. Contract deliveries of chemicals continue of moderate extent, with new bookings relating for the most part to small to medium parcels for near delivery dates. From the point of view of prices the general position shows little change compared with a week ago, although the recovery this week in the metal markets has had a steadying influence on prices of lead and copper compounds.

Heavy Chemicals

No more than a quiet trade is passing in the case of saltcake, but offers of this material are maintained at up to £3 per ton. Bichromate of soda keeps firm at 3⅜d. per lb., less 1 to 2½ per cent., according to quantity and a fair amount of buying interest is being displayed. Hyposulphite of soda is in moderate request with very little quotable alteration on balance in the price position, the commercial grade being quoted at about £9 per ton and the photographic at £15 10s. Chlorate of soda is not too strong a section, current prices for this material being at round £25 per ton. Bicarbonate of soda keeps up very well at about £10 10s. per ton in contracts, and a moderate amount of business is going through. With regard to caustic soda, a quietly steady trade is being done in this section, with offers ranging from £12 15s. to £14 per ton in contracts, according to quality. The demand for sulphide of sodium during the past week has been on a restricted scale, with the 60–65 per cent. concentrated solid material obtainable at round £9 10s. per ton and the commercial product at about £8. There is a moderate inquiry about in the case of alkali, and values are well held at £6 per ton. Current offers of dibasic phosphate of soda range from about £11 to £12 per ton, with the demand at the moment on a quiet scale.

The demand for carbonate of potash is of a quietly steady character, and prices in this section keep up at about £26 5s. per ton. Caustic potash meets with a moderate business and at round £31 per ton there has been little change on the week. Permanganate of potash is selling in limited quantities at from 5¼d. to 5½d. per lb. for the B.P. quality and 5⅛d. per lb. for the commercial kind. Prussiate of potash is attracting a fair amount of attention and quotations are firm at from 6¾d. to 7d. per lb., according to quantity. There is a moderate demand about for bichromate of potash which is fully maintained on the basis of 4⅜d. per lb. Chlorate of potash is easy in tendency at round £26 10s. per ton, and only a quiet business has been reported during the past week.

Sulphate of copper is somewhat steadier in sympathy with the metal and a moderate trade has been done at about £25 5s. per ton, f.o.b. Arsenic is by no means a strong section and at round £15 10s. per ton at the mines for white powdered, Cornish makes, the demand is very subdued. Acetate of lime is in moderate request and values have been pretty well maintained at round £15 per ton for the grey quality and £7 10s. for the brown. The demand for the lead materials is on quiet lines, with nitrate quoted at round £31 10s. per ton and brown and white acetate at £37 and £38.

Acids and Tar Products

Oxalic acid is only in moderate request, but at £1 12s. per cwt., ex store, there has been no further change in prices. Tartaric keeps up at the moment at 1s. 8¾d. per lb., with citric acid at about 1s. 2¾d. per lb., a quiet business being reported in each case. With regard to acetic acid, buying interest is of fair extent and quotations are firm at round £36 10s. per ton for the commercial 80 per cent. strength and £66 for the glacial quality.

The demand for by-products is quiet generally, although so far as prices are concerned there has been little further change. Pitch is maintained on the basis of 47s. 6d. per ton, f.o.b., with creosote oil on offer at from about 3¼d. to 4d. per gallon, naked. Carbolic acid is far from active, with crude 60's on offer at about 2s. 5d. per gallon, naked, and crystals at round 7¼d. per lb. Solvent naphtha is steady and in moderate request at 1s. 2½d per gallon, naked.

Company News

Fullers' Earth Union.—The accounts for the year ended March 31 show, after making provision for depreciation and tax, a balance at the credit of profit and loss, including £2,023 brought in, of £20,141. To reserve is placed £5,000. A final dividend of 8½ per cent., less tax, making 12½ per cent., less tax, and bonus of 1s. per share on the ordinary, less tax, is to be paid, leaving to be carried forward £2,232.

British Oil and Guano.—The profit on working for the year ended March 31, 1930, was £6,549. After adding interest on investments, and transfer fees, and deducting allowance for depreciation, directors' fees, establishment charges, etc. net (including the amount brought forward) amounts to £9,233. The directors recommend a dividend of 1s. 4d. per share (less income-tax), payable on May 15, 1930, requiring £1,292, leaving £7,942 to be carried forward.

Anglo-Chilean Consolidated Nitrate Corporation.—For the six months ended December 31, 1929, the consolidated gross earnings were $2,037,276, compared with $1,484,089 for the same period in 1928 and $848,262 for the same period in 1927. After deducting interest on floating indebtedness, taxes, etc., there remains a balance to surplus account of $919,056, which compares with $685,331 for the corresponding period in 1928 and $374,540 for the last six months of 1927. After deducting $1,126,677 for interest charges on first mortgage 7 per cent. debenture stock and 20-year 7 per cent. sinking fund debenture bonds, there results a deficit of $207,621 for the period, as compared with a deficit of $498,092 for the corresponding period of 1928 and a deficit of $815,510 for the last six months of 1927, in each case before depreciation and depletion. Including depreciation, depletion and amortisation of cost of patents, the operations of the last six months of 1929 resulted in a deficit of $1,299,311, as compared with a deficit for the corresponding period of 1928 of $1,828,756 and for the last six months of 1927 of $2,529,421.

British Cotton and Wool Dyers' Association.—For the year ended March 31 last the accounts show that the profits, after charging administration expenses, £4,042 for specific depreciation and £54,175 for repairs and renewals, also providing an estimated amount in respect of income-tax and other contingencies, amount to £117,226 (as compared with £145,740 for the previous twelve months). After charging audit fees, interest on first mortgage debenture stock and debenture-holders' trustees' fees amounting together to £27,541, there remains a balance of £89,685, out of which £25,000, as last year, is transferred to depreciation fund, which now stands at £82,336, leaving a net profit of £64,685, in contrast with £94,196 last year. Adding the brought forward of £30,057, there is an available balance of £94,742. The directors recommend a dividend on the ordinary shares at the rate of 7½ per cent. per annum, absorbing £58,062, against 10 % for 1928-29, requiring £77,416. The sum of £5,000 is again placed to employés' benefit fund, and £31,680 is carried forward.

New Chemical Trade Mark

Applications for Registration

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Mark can be lodged up to June 7, 1930.

Tunguran.

511,581. Class 1. Chemical substances used in manufactures, photography or philosophical research and anti-corrosives. I.G. Farbenindustrie Aktien-gesellschalt (a joint stock company organised under the laws of Germany), Mainzerlandstrasse 28, Frankfort-on-Main; manufacturers. March 27, 1930.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

AUSTRIA.—The representation of British manufacturers of essences, drugs, chemicals and spirits is required by a firm in Vienna. Ref. No. 373.

SOUTH AFRICA.—The South African Railways and Harbours Administration is calling for tenders, to be presented in Johannesburg by June 26, for the supply of approved brands of varnishes and enamels. Reference number B.X. 6,400.

Tariff Changes

AUSTRALIA.—The operation of the duty of 5½d. per gallon on naphtha, benzine, benzoline, gasoline, pentane, petrol and other petroleum or shale spirit, when in containers of any description, has been deferred until November 1 next. Until then these spirits will remain dutiable as heretofore at 4d. per gallon.

RHODESIA.—The provisions of the South African Food, Drugs and Disinfectants Act have been made applicable to any drug or disinfectant imported through any port in the Union and intended for transmission to Northern Rhodesia.

FRANCE.—By a law dated April 26 the consolidated Turnover Tax of 3½ per cent. on sulphate of copper, nitrates of soda and lime, sulphate of ammonia, crude hydrochlorate of ammonia, nitrate of ammonia, cyanamides, urea, potash salts, basic slag, phosphates, superphosphates, dried blood, beetroot, "*vinasse*," "*crud*" of ammonia, fish waste, wool dust and waste, compound fertilisers and oilcakes, is withdrawn, and provision is made for the exemption from the Turnover Tax of fertilisers and materials intended for the improvement of cultivated lands and of oilcakes for feeding cattle.

GERMANY.—Amendments in various headings and provisions of the German Customs tariff are indicated in a Law of April 15, affecting several chemical products. The duty on dextrine, roasted starch and starchy sizing becomes 24 Reichsmarks per 100 kilogs. in place of 16; on starch sugar and dextrine syrup, 45 in place of 15; on light coal tar oils, asphalt, naphtha and hydrocarbon, 10 instead of being free.

"C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries:—

142. (*Slate Dust*).—A subscriber is anxious to be put into touch with a manufacturer of slate dust, for which he has a prospective large use.

World Application of Fauser Ammonia Process

DATA supplied by Dr. Fauser show that nine plants, using the Fauser synthetic ammonia process, with 215 metric tons daily capacity of anhydrous ammonia, are now operating throughout the world. The six additional plants building, which should begin operations in 1930, will produce an additional 640 tons, bringing the total daily capacity to 855 tons. This does not include the new nitric acid plant in Czechoslovakia. The new plants under construction are located at Astral, Belgium; Lutterade and Sluiskil, Netherlands; Laziska and Tarnow, Poland; and at Trail, B.C. Data showing the plants in operation, additional capacity under construction, and the source of hydrogen, by countries are as follows:—

Country	Metric tons per day. Operating	Building	Source of Hydrogen
Italy.....	140	80	Electrolysis
Belgium ...	25	150	Coke oven gas
Germany ..	15	—	By-product phosphorus mfr.
Netherlands	—	220	Coke oven gas
Poland	—	90	Water gas and coke oven gas
Sweden	10	—	Electrolysis
Japan.....	25	50	Electrolysis
Canada	—	50	Electrolysis
Total	215	630	

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

GENERAL CHEMICAL AND PHARMACEUTICAL CO., LTD., London, N.W. (M., 17/5/30.) Registered May 1, £1,200 mortgage, to Miss E. F. Smart, 60, Avondale Avenue, Finchley; charged on Unit Works, Harrow Road, Sudbury. *Nil. June 18, 1929.

Receiverships

ATTWOOD'S SPRAYING EQUIPMENTS, LTD. (R., 17/5/30.) Walter Kingsbury, of 25, Milton Street, Fore Street, E.C.2, was appointed Receiver on May 10, 1930, by the debenture holders.

FLIK MANUFACTURING CO., LTD. (R., 17/5/30.) W. E. Tydeman, of 73A, Canonbury Road, N.1, was appointed Receiver and Manager on April 28, 1930, under powers contained in debentures dated August 2, 1929.

METAL, ORE AND CHEMICAL CO., LTD. (R., 17/5/30.) H. T. Bloor, of 255, Finsbury Pavement House, E.C.2, was appointed Receiver and Manager on April 29, 1930, under powers contained in debenture dated July 20, 1929.

New Companies Registered

ANTIADIPIC RESEARCH LABORATORIES, LTD., 262, Regent Street, London, W.1.—Registered May 9. Nominal capital, £100 in £1 shares. To carry on the business of manufacturers of and dealers in chemicals, gases, drugs, medicines, plaster of paris, gypsum, plasters, disinfectants, fertilisers, salts and acids, etc. A director: C. Colne.

DOCTORS, LTD., 132, Southwark Street, London, S.E.1.—Registered May 7. Nominal capital, £5,000 in 10,000 ordinary shares of 1s. each and 4,500 7 per cent. cumulative preference shares of £1 each. To acquire the business of a wholesale manufacturer, refiner and merchant of casein and by-products of casein and milk carried on by Ardeshir H. Doctor as "Doctor Casein Works." Directors: Ardeshir H. Doctor and Mrs. Kathleen R. Doctor.

LUMINITE, LTD., 23, Druce Road, Dulwich, London, S.E.21.—Registered May 10. Nominal capital, £200 in £1 shares. Manufacturers of and dealers in colours, oils, paints, varnishes and substitutes for paints, luminous or otherwise, and any substances or solutions for coating surfaces of all kinds of materials, etc. Directors: G. W. Newdick and Miss E. D. A. Byrne, Grange House.

N.B.A., LTD., Wellington House, Buckingham Gate, London.—Registered on May 7 as a company limited by guarantee without share capital, with 150 members each liable for one guinea in the event of winding up. The objects are to consolidate and further the interests of producers of crude and refined benzole and its homologues, or any product derived from the distillation of coal, lignite, shale or other like substances, to standardise benzole and benzole and petrol mixtures for motor spirit, etc. Directors: Sir David Milne-Watson, J. H. Ellis, J. T. Forgie, S. Henshaw, W. G. Adam, E. E. Barnes, T. H. Butler, J. H. Canning, W. R. Hann, N. N. Holden, W. L. Johnson, J. L. Major, R. D. McCowan, Sir Richard Pease, A. Read, H. W. Robinson, B. Sadler, S. A. Sadler, A. G. Saunders, C. S. Shapley, A. W. Smith, A. Westlake.

PROTECTIVE COATINGS, LTD., Broadway Buildings, Westminster, London, S.W.1.—Registered May 8. Nominal capital, £3,000 in £1 shares. Buyers, sellers, manufacturers, refiners and preparers of substances, unguents and ingredients of all kinds used in the manufacture of protective coatings and coverings, paints, pigments, varnishes, dopes, etc. Directors: W. E. Evans, A. H. Dalton.